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DRILL REGULATIONS
FOR
FIELD ARTILLERY
(HORSE AND LIGHT)
UNITED STATES ARMY
(PROVISIONAL)

1911

U.S. General staff.

WAR DEPARTMENT : OFFICE OF THE CHIEF OF STAFF

DRILL REGULATIONS
FOR
FIELD ARTILLERY
(Horse and Light)

UNITED STATES ARMY
(Provisional)

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The following system of Drill Regulations for Field Artillery (Light and Horse) is approved, and is published for the information and government of the Regular Army and the Organized Militia of the United States.

By order of the Secretary of War:

LEONARD WOOD,
Major General, Chief of Staff.

236939

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PART I.

GENERAL PRINCIPLES AND DEFINITIONS.

CHAPTER I.—GENERAL PRINCIPLES.

SECTION I.—*Instruction.*

Object of the Instruction.

1. The sole reason for the existence of field artillery is its ability to assist the other arms, especially the infantry, upon the field of battle.

The degree to which the field artillery prepares itself to render this assistance is, then, the only measure of its training. No refinements of drill-ground instruction or other minor details must be allowed to obscure this definite object or to impede progress toward its attainment.

2. To enable it to render effective assistance upon the battlefield artillery must be able, first, to march rapidly and in good order and to establish itself, promptly and without confusion, in such positions as will best utilize the available terrain; second, to deliver an effective and overpowering fire upon any designated part of the enemy's position.

Thorough training in marching, camping, reconnaissance and communication service, fire discipline, conduct of fire and fire direction, carried out over varied country, is essential to the attainment of these qualifications.

3. An additional object of instruction is to develop resourcefulness, initiative and self-reliance on the part of field artillerymen of all grades.

4. These regulations prescribe a method of training in the ordinary duties pertaining to the service of field artillery. The personnel must be so thoroughly drilled that in the excitement of action the duties will be performed as a matter of second nature.

The regulations also outline general principles according to which field artillery is to be handled and fought. A guide is thus furnished as to the best way of dealing with the usual problems which arise. But every problem which arises in service has its own best solution, and this solution must be evolved by the officer on the spot. His success will depend upon the extent to which he has prepared himself by previous thought and study and by previous practice in the solution of similar problems.

5. Instruction in peace must therefore be conducted with a view, first, to drilling the personnel thoroughly in their habitual duties; second, to affording officers and men practice and experience in dealing with the situations and difficulties apt to arise in campaign.

6. The annual program of instruction for field artillery is announced in orders from the War Department. In conformity with such program, solutions of practical problems involving tactical situations with appropriate units should be required. Practice by officers in making proper dispositions to meet the requirements and developments of tactical situations is the best training for service in war. Thorough knowledge of their own arm is not sufficient for officers of field artillery; they must also know the manner in which the other arms march and the tactical principles which guide those arms in battle.

Officers should be trained to think quickly and logically and to assume responsibilities unhesitatingly. Errors of judgment should always be pointed out by the proper commanders; but such errors should not be criticized harshly, as such criticism causes timidity and consequent inaction, which are generally more productive of harm than is misdirected zeal.

7. It is made the duty of all field artillery commanders to see that instruction is conducted in accordance with the principles and that the means employed are in conformity with the spirit of the regulations, but in the application of the principles to the solution of practical problems the methods prescribed are to be taken as guides only. Great latitude should be allowed in adapting these methods to the peculiar conditions of different cases, and subordinates should be encouraged in every way possible to exercise their skill and ingenuity in solving the problems which present themselves in service.

Sequence and Methods of Instruction.

8. A progressive order will be followed in all field artillery instruction. The annual course of instruction should commence with the smallest unit, the section, and proceed to the larger ones in succession, culminating in the field maneuvers and firing practice of the larger units.

9. Thorough training of the individual soldier is the basis of efficiency. Great precision and attention to detail are essential in this instruction, in order that the soldier may acquire that habit of implicit obedience to orders and of accurate performance of his individual duties which is indispensable in combined training.

10. Recruits should be assembled in small squads for the beginning of their instruction. As the instruction progresses, they will be gradually grouped according to proficiency, in order that all may advance as rapidly as their abilities permit. Those who lack aptitude and quickness will be separated from the others and placed under the most experienced drillmasters.

11. Short and frequent drills are preferable to long ones, which exhaust the attention of both instructor and recruit.

12. The instructor of each unit is habitually its immediate chief, who should be given all due latitude in conducting the instruction and be held to strict accountability for results attained. A habit of self-reliance and a feeling of responsibility for the instruction of their respective units, as well as a proper feeling of pride therein, may thus be developed among the subdivision commanders.

The instructor will always maintain a military bearing and, by a quiet, firm demeanor, set a proper example to the men. Faults should be corrected gradually, without nagging or shouting.

13. Officers and noncommissioned officers of each grade should be frequently practiced in the duties of the next higher grade.

14. The training will include, in addition to what is prescribed in these regulations, instruction in the duties of sentinels, the care of equipments, packing field kits, tent pitching, pistol practice, and the customs and courtesies of the service.

SECTION II.—*General rules.*

15. Movements that may be executed toward either flank are explained as toward but one flank, it being necessary to substitute ***left*** for ***right***, or the reverse, to have the command and explanation of the corresponding movement toward the other flank.

16. Any movement may be executed either from the halt or when marching, unless otherwise prescribed.

17. All movements on foot not specially excepted may be executed in double time. If the movement be from the halt, or when marching in quick time, the command ***double time*** precedes the command ***march;*** if marching in double time, the command ***double time*** is omitted.

18. All mounted movements not specially excepted may be executed at the trot or gallop.

19. The gait should habitually be increased or decreased progressively, the trot being executed from the walk, and the gallop from the trot. If marching at the gallop, the gait will be decreased to the trot, then to the walk, before halting; if marching at the trot, the same rule applies, halting from the trot or gallop being considered an exceptional movement.

20. To execute a movement at the trot or gallop, the command ***trot*** or ***gallop*** precedes the command ***march,*** unless marching at the gait desired.

21. Movements or procedures explained for the smaller units are, in general, applicable to the larger ones when under instruction of the same character, the commands being modified so as to be adapted to the particular unit dealt with.

22. The intervals and distances prescribed in the text are in general such that, if marched by the flank from line, the elements will be in column at proper distances; or if marched by the flank from column, they will be in line at proper intervals. Similarly, if marching obliquely, a second oblique will place the elements in line or column, as the case may be, at proper intervals or distances. If, however, due to differences of length of elements, these conditions do not accurately obtain, the proper intervals or distances are gradually secured by appropriate modifications of the gait.

23. If, in forming elements abreast of each other, the commands: 1. ***Battery*** (***Platoon,*** etc.), 2. ***HALT,*** be given during the movement, only those elements halt which have reached their new positions; the others continue the march and halt on reaching their positions.

24. For the purpose of correcting errors while marching, the instructor may command: 1. ***In place,*** 2. ***HALT;*** when all halt and stand fast. To resume the march, he commands: 1. ***Resume,*** 2. ***MARCH.***

25. To revoke a preparatory command, or, being at a halt, to begin anew a movement improperly begun, the instructor commands: ***AS YOU WERE,*** at which the movement ceases and the former position is resumed.

26. If a change of formation requires a change of post of officers and noncommissioned officers, they proceed by the shortest routes to their posts in the new formation.

27. While the posts of officers and noncommissioned officers are specified in the text, as instructors they go wherever their presence is necessary.

28. Officers and noncommissioned officers commanding organizations or subdivisions thereof, when absent, are ordinarily replaced by the next in rank in their organization or subdivision.

29. For administrative purposes each unit of field artillery has its permanent designation, thus:

The First, Second, Third, Fourth, etc., Regiment of Field Artillery;

The First Battalion, Fifth Regiment of Field Artillery;

Battery D, Sixth Field Artillery;

The first, second, third, etc., platoon of a battery;

The first, second, third, fourth, etc., section of a battery.

For purposes of drill and maneuver. units will be designated by their temporary relative position in line or column, thus:

The right battery, left battalion;

The leading platoon, center battery;

The left section, right platoon.

The permanent numerical designation of units does not change as their relative order in line or column is changed, with this exception:

After the pieces of a battery are unlimbered and established in line, they are designated from right to left as No. 1, No. 2, No. 3, and No. 4.

SECTION III.—*Commands.*

30. Commands are of two kinds: ***Preparatory commands*** and ***commands of execution.***

The preparatory command, such as ***forward,*** indicates the movement that is to be executed.

The command of execution, such as ***MARCH, HALT,*** causes the execution.

Preparatory commands are distinguished in the text by *italics;* those of execution by CAPITALS.

31. The commands prescribed in the text are given by the instructor, except when otherwise specified.

32. To permit of the preparatory command being understood, a well-defined pause should be made between it and the command of execution. The duration of this pause depends in a measure upon the size of the body of troops under command. Ordinarily, in dismounted movements and in mounted movements executed from a halt, the pause should be brief and of uniform duration, as otherwise uncertainty is communicated to the ranks, and a ragged execution of the movement results.

33. The tone of command is animated, distinct, and of a loudness proportioned to the number of men under command. Indifference in giving commands leads to laxity in execution.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a firm, brief tone.

In mounted movements, the preparatory commands are more or less prolonged, to insure their being heard; the command of execution is always prolonged.

When giving commands to troops, it is usually best to face or look toward them.

34. To secure uniformity, officers and noncommissioned officers are practiced in giving commands.

35. The bugle calls and prescribed arm signals are frequently used in instruction, in order that the officers and men may readily recognize them.

CHAPTER II.—DEFINITIONS.

36. ***Alignment:*** A straight line upon which several men, teams, carriages, or bodies of troops are formed, or are to be formed, or the formation of such line.

Base: The element on which a movement is regulated or on which a formation is made.

Center: The middle point or element of a command.

Column: A formation in which the elements are placed one behind another.

Conduct of fire: The employment of the technical means necessary to cause fire of the desired nature to be brought to bear upon the target.

Depth: The space from head to rear of any formation, including the leading and rear elements.

Disposition: The arrangement of the elements in a formation.

Distance: Open space between elements in the direction of depth.

Element: One of the component parts of a larger unit—as a file, gun squad, team, carriage, section, platoon, battery, etc.

Facing distance: About 14 inches, i. e., the difference between the front of a man in ranks, including his interval, and his depth.

File: Two men—the front-rank man and the corresponding man of the rear rank. The front-rank man is the ***file leader.*** A file which has no rear-rank man is a ***blank file.*** The term ***files*** applies also to individual men in single-rank formation. A single mounted man in ranks is also called a file.

File closers: The officers, noncommissioned officers and men acting as such, who, in dismounted formations, are posted 1 yard in rear of the rear rank in line.

Fire direction: The tactical direction of one or more fire units with a view to bringing their fire to bear at the right place at the right time.

Fire discipline: That condition resulting from training and practice which insures an orderly and efficient working of the personnel in the delivery of fire.

Flank: The right or left of a command in line or column; also the element on the right or left of a line.

By the enemy's ***right (left) flank*** is meant the flank which the enemy himself would so designate.

Formation: Arrangement of the elements of a command in their order in line, in column, or for battle.

Front: The space in width occupied by a command either in line or column. The term ***front*** is also used to denote the direction in which the elements of a command face, as well as to denote the direction of the enemy.

The ***front*** of a gun unlimbered is the direction in which the muzzle points; of a limber or of a carriage limbered, the direction in which the pole points.

Guide: An officer, noncommissioned officer, or private upon whom a command or an element thereof regulates its march.

Interval: Open space between elements abreast of each other.

Laying: The process of pointing a gun for range and direction, so as to cause the trajectory to pass through the target.

Left: The left extremity or element of a body of troops.

Line: A formation in which the different elements are abreast of each other. When the elements are in column the formation is called a ***line of columns.***

Maneuver: A movement executed by a battery or larger unit for the purpose of changing from one formation to another.

Rank: A line of men, horses, teams, or carriages abreast of each other.

Right: The right extremity or element of a body of troops.

Salvo: A single discharge from each of the guns of a battery or other unit fired in regular order from one flank to the other, with intervals of about three seconds.

Volley: The rapid discharge of a certain indicated number of rounds, by each gun of a battery or other unit, each gun firing without regard to the others.

PART II.

DISMOUNTED INSTRUCTION.

CHAPTER I.—GENERAL RULES.

37. Formations are habitually in double rank; the men always fall in at attention.

38. The interval between men in ranks is 4 inches and between ranks in flank column is 26 inches, measured from elbow to elbow. The distance between ranks and between files in flank column is 1 yard, measured from the back of the man in front to the breast of the man in rear.

The allowance for the front of a man is taken at about 26 inches, including the interval; the depth, about 12 inches.

Distance between subdivisions in column is measured from guide to guide.

39. To secure uniformity of interval between files when falling in and in the alignments, each man places the palm of the left hand upon the hip, fingers pointing downward, thumb to the front. In falling in, the hand is dropped by the side as soon as the man next on the left has his interval; in the alignments, at the command *front*.

40. When marching in flank column, the leading man of the front rank is, without indication, the guide of the column.

During the oblique march, the leading man of the leading rank is, without indication, the guide.

When marching in line, the front-rank man on the designated flank is the guide; in column of subdivisions, the leading guide is the guide of the column; in line of subdivision columns, the guide of the subdivision on the designated flank is the guide of the line.

41. When marching in line, in column of subdivisions, or in line of subdivision columns, the guide is always announced as soon as the march is begun, or as soon as the line or column is formed. On marching to the rear from line, or on taking the full step after a turn, the guide is announced as soon as the march in the new direction is begun. For example—

Being in line at a halt:

1. ***Forward***, 2. ***MARCH***, 3. ***Guide*** (***right*** or ***left***).

Being in line:
1. ***Sections right,*** 2. ***MARCH,*** 3. ***Full step,*** 4. ***MARCH,*** 5. ***Guide*** (***right*** or ***left***).

Being in flank column:
1. ***Sections column right*** (***left***), 2. ***MARCH,*** 3. ***Guide*** (***right*** or ***left***).

Marching in line:
1. ***To the rear,*** 2. ***MARCH,*** 3. ***Guide*** (***right*** or ***left***); or,
1. ***Right turn,*** 2. ***MARCH,*** 3. ***Full step,*** 4. ***MARCH,*** 5. ***Guide*** (***right*** or ***left***).

CHAPTER II.—THE SOLDIER DISMOUNTED.

SECTION I.—*General provisions.*

42. This instruction has for its object the training of the individual recruit and afterwards that of the squad. It must be given with the greatest attention to detail.

43. In the instruction of the recruit, frequent short rests should be given, in order that the men may not be unduly fatigued.

The instructor will take advantage of these rests to instruct the recruits in the customs and courtesies of the service, the duties of orderlies, the proper manner of receiving messages from and delivering them to officers, etc., so that when the recruit is finally reported for duty he will not only know his prescribed drill thoroughly, but will know how to conduct himself out of ranks as a trained soldier.

44. From the beginning the instructor will insist on a smart appearance of the recruits, and will require that their clothing be clean and neatly adjusted.

45. The instructor briefly explains each movement, at first executing it himself if necessary. He exacts by degrees the desired precision and uniformity.

SECTION II.—*The recruit.*

46. For the individual instruction, a few recruits, usually not exceeding four, are placed in a single rank, facing to the front and about 4 inches apart.

They execute the marchings as explained for a squad.

Position of the Soldier, or Attention.

47. Heels on the same line and as near each other as the conformation of the man permits.

Feet turned out equally and forming with each other an angle of about 45°.

Knees straight without stiffness.

Body erect on the hips, inclined a little forward; shoulders square and falling equally.

Arms and hands hanging naturally, backs of the hands outward; little fingers opposite the seams of the trousers; elbows near the body.

Head erect and square to the front, chin slightly drawn in without constraint, eyes straight to the front.

To Assemble.

48. To teach the recruits to assemble, the instructor requires them to place the palm of the left hand upon the hip, below the belt when worn; he then places them on the same line so that the right arm of each man rests lightly against the elbow of the man next on his right, and then directs the left hand to be replaced by the side.

When the recruits have learned how to take their places, the instructor commands: ***FALL IN.***

They assemble rapidly as above prescribed, each man dropping the left hand as soon as the man next on his left has his interval.

The Rests.

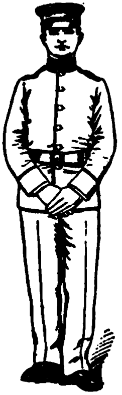
49. Being at a halt, the commands are: ***FALL OUT; REST; AT EASE;*** and, 1. *Parade*, 2. ***REST.***

At the command *fall out,* the men leave the ranks, but remain in the immediate vicinity. At the command *fall in,* they resume their former places.

At the command *rest,* each man keeps one foot in place, but is not required to preserve silence or immobility.

At the command *at ease,* each man keeps one foot in place and preserves silence, but not immobility.

1. *Parade,* 2. ***REST.*** Carry the right foot 6 inches straight to the rear, left knee slightly bent; clasp the hands, without constraint, in front of the center of the



Pl. 1, Par. 49.

body, fingers joined, left hand uppermost, left thumb clasped by thumb, and forefinger of right hand; preserve silence and steadiness of position.

50. To resume the attention: 1. *Squad,* 2. *ATTENTION.*

The men take the position of the soldier and fix their attention.

To Dismiss the Recruits.

51. Being in line at a halt: *DISMISSED.*

Eyes Right or Left.

52. 1. *Eyes,* 2. *RIGHT (LEFT),* 3. *FRONT.*

At the command *right,* turn the head to the right so as to bring the left eye in a line about 2 inches to the right of the center of the body, eyes fixed on the line of eyes of the men in, or supposed to be in, the same rank.

At the command *front,* turn the head and eyes to the front.

Facings.

53. To the flank: 1. *Right (Left),* 2. *FACE.*

Raise slightly the left heel and right toe, face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot; place the left foot by the side of the right. Left face is executed on the left heel.

To face in marching and advance, turn on the ball of the foot in advance and step off with the other foot in the new line of direction; to face in marching without gaining ground in the new direction, turn on the ball of the foot in advance and mark time.

To the rear: 1. *About,* 2. *FACE.*

Raise slightly the left heel and right toe, face to the rear, turning to the right on the right heel and the ball of the left foot; replace the left foot by the side of the right.

Officers execute the about face as follows:

At the command *about,* carry the toe of the right foot about 8 inches to the rear and 3 inches to the left of the left heel without changing the position of the left foot.

At the command *face,* face to the rear, turning to the right on the left heel and right toe; replace the right heel by the side of the left.

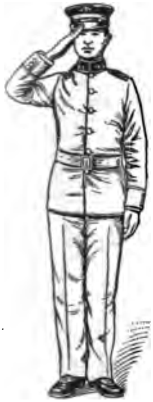
Enlisted men out of ranks may use the about face prescribed for officers.

Salute With the Hand.

54. 1. ***Right (Left) hand,*** 2. ***SALUTE.***

Raise the right hand smartly till the tip of forefinger touches the lower part of headdress (if uncovered, the forehead) above the right eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45°, hand and wrist straight. ***TWO.*** Drop the arm smartly by the side.

The salute for officers is the same; the left hand is used only when the right is engaged. Enlisted men salute with the hand farthest from the officer. Officers and men, when saluting, look toward the person saluted.



Pl. 2, Par. 54.

Setting-up Exercises.

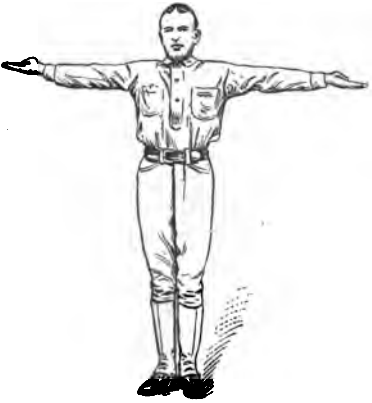
55. All soldiers are regularly practiced in the following exercises, which may be supplemented by those in authorized calisthenic manuals.

The instructor places the men about 2 yards apart.

In these exercises it is advisable to remove coats and caps.

As a rule, the instructor will not keep the men in a constrained position longer than is necessary to give the next command; and while giving any extended explanation, he will keep the men at ease.

As soon as the exercises are well understood, they may be continued without repeating the commands. For this purpose the instructor gives the commands as prescribed, then adds: ***Continue the exercise;*** upon which the motions to be repeated are continuously executed until the command ***halt.***



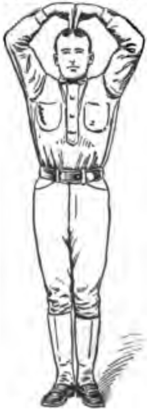
Pl. 3, Par. 55, 1 Ex.

At the command *halt*, given at any time, the position of the soldier is resumed.

First Exercise.

1. ***Arm***, 2. ***EXERCISE***, 3. ***HEAD***, 4. ***UP***, 5. ***DOWN***, 6. ***RAISE***.

At the command *exercise*, raise the arms laterally until horizontal, palms upward. ***HEAD:*** Raise the arms in a circular direction over the head, tips of fingers touching top of the head, backs of fingers in contact their full length, thumbs pointing to the rear, elbows pressed back. ***UP:*** Extend the arms upward their full length, palms touching. ***DOWN:*** Force the arms obliquely back and gradually let them fall by the sides. ***RAISE:*** Raise the arms laterally, as prescribed for the second command. Continue by repeating *head, up, down, raise*.



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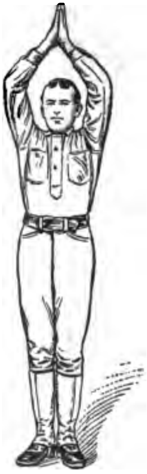

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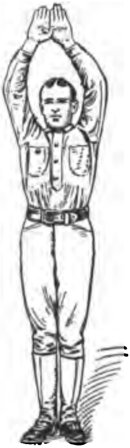
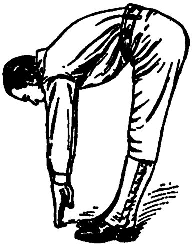


Pl. 6, Par. 55,
2 Ex.

Second Exercise.

1. ***Arms vertical, palms to the front***, 2. ***RAISE***, 3. ***DOWN***, 4. ***UP***.

At the command *raise*, raise the arms laterally from the sides, extended to their full length, till the hands meet above the head, palms to the front, fingers pointing upward, thumbs locked, right thumb in front, shoulders pressed back. ***DOWN:*** Bend over till the hands, if possible, touch the ground, keeping the arms and knees straight. ***UP:*** Straighten the body and swing the extended arms, thumbs locked, to the vertical position. Continue by repeating *down, up*.

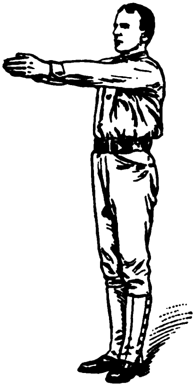


Pl. 7, Par. 55, 2 Ex.

Third Exercise.

1. ***Arm,*** 2. ***EXERCISE,*** 3. ***FRONT,*** 4. ***REAR.***

At the command ***exercise,*** raise the arms laterally until horizontal, palms upward. ***FRONT:*** Swing the extended arms horizontally to the front, palms touching. ***REAR:*** Swing the extended arms well to the rear, inclining them slightly downward, raising the body upon the toes. Continue by repeating ***front, rear,*** till the men, if possible, are able to touch the backs of the hands behind the back.



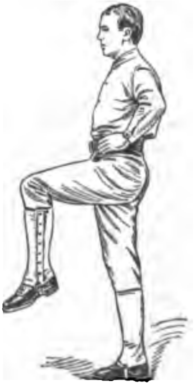
Pl. 8, Par. 55, 3 Ex.

Fourth Exercise.

1. ***Leg.*** 2. ***EXERCISE,*** 3. ***UP.***

At the command ***exercise,*** place the palms of the hands on the hips, fingers to the front, thumbs to the rear, elbows pressed back. ***UP:*** Raise the left leg to the front, bending and elevating the knee as much as possible, leg from knee to instep vertical, toe depressed. ***UP:*** Replace the left foot and raise the right leg as prescribed for the left.

Execute slowly at first, then gradually increase to the cadence of double time. Continue by repeating ***up*** when the right and left legs are alternately in position.



Pl. 9, Par. 55, 4 Ex.

Fifth Exercise.

1. ***Leg,*** 2. ***EXERCISE,*** 3. ***Left (Right),*** 4, ***FORWARD,*** 5. ***REAR;*** or, 5. ***GROUND.***

At the command ***exercise,*** place the hands on the hips, as in fourth exercise. ***FORWARD:*** Move the left leg to the front, knee straight, so as to advance the foot about 15 inches, toe turned out, sole nearly horizontal, body balanced on right foot. ***REAR:*** Move the leg to the rear, knee straight, toe on a line with the right heel, sole nearly horizontal. Continue by repeating ***forward, rear.***

When the recruit has learned to balance himself, the command ***forward*** is followed by ***GROUND:*** Throw the weight of the body forward by rising on the ball of the right foot, advance and plant the left, left heel 30 inches from the right, and advance the right leg quickly to the position of ***forward.*** Continue by repeating ***ground*** when the right and left legs are alternately in the position of ***forward.***

Sixth Exercise.

1. ***Lung,*** 2. ***EXERCISE,*** 3. ***INHALE,*** 4. ***EXHALE.***

At the command ***exercise,*** place the hands on the hips as in fourth exercise. ***INHALE:*** Inflate the lungs to full capacity by short, successive inhalations through the nose. ***EXHALE:*** Empty the lungs by a continuous exhalation through the mouth. Continue by repeating ***inhale, exhale.***

STEPS AND MARCHINGS.

Quick Time.

56. The length of the full step in quick time is 30 inches, measured from heel to heel, and the cadence is at the rate of 120 steps per minute.

57. To march in quick time: 1. ***Forward,*** 2. ***MARCH.***

At the command ***forward,*** throw the weight of the body upon the right leg, left knee straight.

At the command ***march,*** move the left foot smartly, but without jerk, straight forward 30 inches from the right, measuring from heel to heel, sole near the ground; straighten and turn the knee slightly out; at the same time throw the weight of the body forward, and plant the foot without shock, weight of body resting upon it; next, in like manner, advance the right foot and plant it as above; continue the march.

The cadence is at first given slowly, and gradually increased to that of quick time.

The arms swing naturally, the hands moving about 6 inches to the front and 3 inches to the rear of the seam of the trousers.

58. The instructor, when necessary, indicates the cadence of the step by calling ***one, two, three, four;*** or, ***left, right,*** the instant the left and right foot, respectively, should be planted.

Double Time.

59. The length of the full step in double time is 36 inches; the cadence is at the rate of 180 steps per minute.

60. To march in double time: 1. ***Forward,*** 2. ***Double time,*** 3. ***MARCH.***

At the command ***forward,*** throw the weight of the body on the right leg.

At the command ***march,*** raise the hands until the forearms are horizontal, fingers closed, nails toward the body, elbows to the rear; carry forward the left foot, knee slightly bent and somewhat raised, and plant the foot 36 inches from the right; then execute the same motion with the right foot; continue this alternate movement of the feet, throwing the weight of the body forward, and allowing a natural swinging motion of the arms.

If marching in quick time, the command ***forward*** is omitted. At the command ***march,*** given as either foot strikes the ground, take one step in quick, and then step off in double time.

To resume the quick time: 1. ***Quick time,*** 2. ***MARCH.***

At the command ***march,*** given as either foot strikes the ground, advance and plant the other foot in double time, resume the quick time, dropping the hands by the sides.

Recruits are also exercised in running, the principles being the same as for double time.

When marching in double time and in running, the men breathe as much as possible through the nose, keeping the mouth closed.

Distances of 100 and 180 yards are marked on the drill ground, and noncommissioned officers and men practiced in keeping correct cadence and length of pace in both quick and double time.

To Halt.

61. To arrest the march in quick or double time: 1. ***Squad,*** 2. ***HALT.***

At the command ***halt,*** given as either foot strikes the ground, advance and plant the other foot; place the foot in rear by the side of the other. If in double time, drop the hands by the sides.

The ***halt,*** while ***marking time,*** and marching at the ***half step, side step,*** and ***back step,*** is executed by the same commands.

To Mark Time.

62. Being in march: 1. *Mark time,* 2. *MARCH.*

At the command *march,* given as either foot strikes the ground, advance and plant the other foot; bring up the foot in rear, and continue the cadence by alternately raising and planting each foot on line with the other. The feet are raised about 4 inches from the ground and planted with the same energy as when advancing.

To resume the full step: 1. *Full step,* 2. *MARCH.*

Half Step.

63. Being in march: 1. *Half step,* 2. *MARCH.*

At the command *march,* given as either foot strikes the ground, take steps of 15 inches.

To resume the full step: 1. *Full step,* 2. *MARCH.*

The length of the half step in double time is 18 inches.

Side Step.

64. Being at a halt: 1. *Right (Left) step,* 2. *MARCH.*

Carry and plant the right foot 10 inches to the right; bring the left foot beside it and continue the movement in the cadence of quick time.

The side step is used for short distances only and is not executed in double time.

Back Step.

65. Being at a halt: 1. *Backward,* 2. *MARCH.*

At the command *march,* step back with the left foot 15 inches straight to the rear, then with the right, and so on, the feet alternating.

At the command *halt,* bring back the foot in front to the side of the one in rear.

The back step is used for short distances only, and is not executed in double time.

Change Step.

66. Being in march: 1. *Change step,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot; plant the toe of the right foot near the heel of the left and step off with the left foot.

The change on the right foot is similarly executed, the command *march* being given as the left foot strikes the ground.

To March to the Rear.

67. Being in march: 1. *To the rear,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot; then turning on the balls of both feet, face to the right about and immediately step off with the left foot.

If marching in double time, turn to the right about, taking four steps in place, keeping the cadence, and then step off with the left foot.

To March by the Flank.

68. Being in march: 1. *By the right (left) flank,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot, then face to the right in marching and step off in the new direction with the right foot.

Covering and Marching on Points.

69. It should be demonstrated to the recruits that they can not march in a straight line without selecting two points in the desired direction and keeping them covered while advancing.

The instructor indicates two points and requires the recruits in succession to place themselves upon the prolongation of the straight line through these points and then to march upon them in both quick and double time.

A distant and conspicuous landmark is then indicated as a point of direction; the recruit is required to select an intermediate point in line with the point of direction and to march on this line, selecting new points as he advances.

SECTION III.—*The squad.*

70. As soon as the recruits are sufficiently instructed for the purpose, they are formed into squards of convenient size in order to teach them the principles of the alignments, taking intervals, the marchings and the turnings.

71. For this instruction, the recruits are formed in double rank. The files on the right and left of the squad are always complete; if there be an incomplete file, it will be the second from the left. The rear-rank men cover their file leaders accurately at one yard distance.

In the case of a small number of recruits, they may be formed in single rank. The movements described for the double rank formation apply equally well to the single rank, omitting the explanations for the rear-rank men.

To Form the Squad.

72. To form the squad, the instructor designates a recruit as the front-rank man of the right file and indicates to him where the right of the squad is to rest; he then places himself about three yards in front of where the center is to be formed, and commands: ***FALL IN.***

The men form on the designated recruit, in two ranks facing to the front, as already prescribed (Par. 48).

73. The squad executes *the rests;* resumes *the attention; marks time;* and executes *the facings, the setting-up exercises, the steps,* and *the halt,* and is dismissed by the same commands and means as explained for the recruit.

Alignments.

74. The alignments are first taught by requiring the recruits to align themselves upon two files established as a base.

Being at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few paces, and establishes them as a base; he then commands: 1. *Right (Left),* 2. ***DRESS,*** 3. ***FRONT.***

At the command *dress,* the first two files execute *eyes right,* and place the left hand upon the hip. The remaining files march to the front, each man shortening the last step so as to place himself about 6 inches in rear of the new alignment, which should never be passed; each man then executes *eyes right,* places the left hand upon the hip, whether dressing to the right or left, and taking steps of 2 or 3 inches moves up and places his right arm lightly against the elbow of the man on his right, so that his eyes and shoulders are in line with those of the men on his right.

The instructor verifies the alignment of both ranks from the right flank and orders up or back such men as may be in rear or in advance of the line; only the men designated move.

At the command *front*, given when the ranks are aligned, each man turns his head and eyes to the front and drops his left hand by the side.

75. At first, the basis of the alignment is established parallel to the front of the squad; afterwards, in oblique directions.

76. The recruits having learned to align themselves, the instructor establishes the base file and commands: 1. *Right (Left),* 2. ***DRESS,*** 3. ***FRONT.***

At the command *dress,* the men, except the base file, move forward and all dress as previously explained, the rear-rank men being careful to cover their file leaders accurately.

77. Alignments to the rear are executed on the same principles; 1. *Right (Left) backward,* 2. ***DRESS,*** 3. ***FRONT.***

The men step back, halt a little in rear of the line, and immediately dress up as previously explained.

78. To execute the alignments, using the side step, the instructor establishes the base file a short distance to the right or left of the squad, and commands: 1. *Right (Left) step,* 2. *(Right* or *Left),* 3. ***DRESS,*** 4. ***FRONT.***

At the command *dress,* the men execute the side step, close toward the base file, and dress as previously explained.

To Take Intervals.

79. Being in line at a halt: 1. *To the right (left) take intervals,* 2. ***MARCH,*** 3. *Squad,* 4. ***HALT.***

At the first command, the rear rank steps back to 2 yards distance from the front rank; at the command *march,* all face to the right and the leading man of each rank steps off; the other men step off in succession so as to follow the preceding man at 2 yards.

At the command *halt,* given when all have their intervals, all halt and face to the front.

To Assemble.

80. 1. *To the right (left) assemble,* 2. ***MARCH.***

The front-rank man on the right stands fast, the rear-rank man on the right closes to 1 yard. The other men face to the right, close by the shortest line, and face to the front.

MARCHINGS.

81. During the marchings the guide conducts the march, preserving with great care the direction and the length and cadence of the step, selecting points on which to march, as explained in paragraph 69.

To March to the Front.

82. Being at a halt: 1. ***Forward,*** 2. ***MARCH.***

The men step off and march straight to the front.

If in line, the rear-rank men follow their file leaders accurately. The instructor sees that the ranks preserve the alignment and the intervals toward the side of the guide. The men yield to pressure from that side and resist pressure from the opposite side; by slightly shortening or lengthening the step they gradually recover the alignment, and by slightly opening out or closing in they gradually recover the interval, if lost; while habitually keeping the head to the front, they may occasionally glance toward the side of the guide to assure themselves of the alignment and interval, but the head is turned as little as possible for this purpose.

If in flank column, the men of the leading file step off at full step; the leading rear-rank man marches abreast of his file leader at 26 inches interval. The other files march at the half step, each taking the full step when at 1 yard distance.

To March to the Rear.

83. Being in march: 1. ***To the rear,*** 2. ***MARCH.***

Executed as explained in paragraph 67.

If at a halt, the squad may be faced about and then moved forward, as explained in the preceding paragraph; or, without facing about, it may be marched a short distance to the rear, as explained in paragraph 65, by the command: 1. ***Backward,*** 2. ***MARCH.***

Whenever the squad in line is faced about or marched to the rear, all men in the front rank not covered step into the new front rank.

To March by the Flank.

84. Marching in line: 1. ***By the right (left) flank,*** 2. ***MARCH.***

Executed as explained in paragraphs 68 and 82.

The formation obtained by marching by the flank from line is called a ***flank column***

If at a halt, the squad may be marched by the flank by first facing it in the desired direction and then moving it forward, as explained in paragraph 82.

When the march by the flank is executed from flank column while at 1 yard distance, the files close in gradually toward the guide until they have the prescribed interval.

85. Whenever the flank column is halted while marching at 1 yard distance, the leading file halts at the command; the others close to facing distance before halting.

86. To close up in flank column without halting: 1. ***Close,*** 2. ***MARCH.***

The leading file takes the half step; the other files close to facing distance and take the half step; all the files having closed to facing distance, the column is halted or marched by the flank, as previously explained.

87. To halt the flank column without closing up: 1. ***In place,*** 2. ***HALT.***

To March Obliquely.

88. For the instruction of recruits, the squad being correctly aligned, the instructor causes the squad to face half right or half left, points out to the men their relative positions, and explains that these are to be maintained in the oblique march.

89. 1. ***Right (Left) oblique,*** 2. ***MARCH.***

Each man steps off in a direction 45° to the right of his former front. He preserves his relative position, keeping his shoulders parallel to those of the guide, and so regulates his step as to keep the ranks parallel to their original direction.

If the command ***halt*** be given while marching obliquely, the men halt faced in the direction in which they are marching.

To resume the oblique march: 1. ***Forward,*** 2. ***MARCH.***

At ***half step*** or ***mark time,*** while obliquing, the oblique march is resumed by the commands: 1. ***Full step,*** 2. ***MARCH.***

90. While obliquing, to execute a second oblique in either direction: 1. ***Right (Left) oblique,*** 2. ***MARCH.***

If line be formed, the files, if not at proper intervals, close in gradually toward the guide; similarly, if flank column be formed, the files, if not at 1 yard distance, fall back as prescribed in paragraph 82.

To Change Direction in Flank Column.

91. 1. ***Column right (left),*** 2. ***MARCH.***

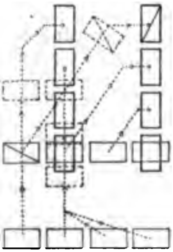
The pivot man of the leading file faces to the right in marching and takes the half step; the man on the marching flank, by twice obliquing to the right, places himself abreast of the pivot man; the latter then takes the full step. The other files march squarely up to the turning point and execute the change of direction on the same ground and in the same manner. When executed from a halt, all the men step off at the command march.

TURNINGS.

To Turn on Fixed Pivot.

92. Being in line: 1. ***Squad right (left),*** 2. ***MARCH,*** 3. ***Squad,*** 4, ***HALT;*** or, 3. ***Full step,*** 4. ***MARCH.***

At the second command, the pivot man marks time, turning to the right in his place; the other front-rank men, by twice obliquing to the right, place themselves abreast of the pivot man and mark time. The rear rank does not turn as a rank; the men conform to the movement of the front rank, place themselves covering their file leaders at a distance of 1 yard, and mark time. The fourth command is given when the last man arrives in his new position.

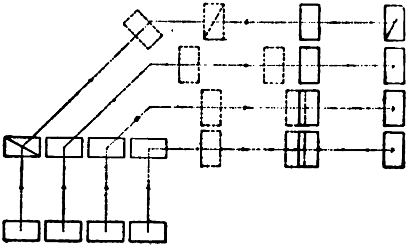

Pl. 10, Par. 92.

The ***turn on fixed pivot*** is used in all formations from line into column and the reverse.

To Turn on Moving Pivot.

93. Marching in line: 1. ***Right (Left) turn,*** 2. ***MARCH,*** 3. ***Full step,*** 4. ***MARCH.***

At the second command, the pivot man, who is the guide during the movement, faces to the right in marching and takes the half step; the other front-rank men, by twice obliquing to the right, place themselves abreast of the pivot man and take the half step. The rear rank advances and turns on the same ground and in the same manner as the front rank, maintaining the distance of one yard. All take the full step at the fourth command, which is given when the last man arrives in his new position.


Pl. 11, Par. 93.

The movement is similarly executed from a halt. At the second command, the pivot man faces to the right as in marching and steps off at half step.

Right (Left) half turn is executed in a similar manner. The pivot man makes a half change of direction to the right and the other men make quarter changes in obliquing.

The *turn on moving pivot* is used by subdivisions of a column in executing changes of direction.

94. The exercises of a *gun squad dismounted* and of a *section dismounted* are similarly executed, substituting in the latter case the word *section* for *squad* in the commands.

SECTION IV.—*Manual of the pistol.*

95. The instruction under this head is first given on foot.

When a lanyard is used, one end is attached to the butt of the pistol; the other end forms a sliding loop, which is passed over the head and drawn snug against the right armpit. The lanyard should then be of just such length that the arm can be extended without constraint.

96. The pistol being in the holster, to raise pistol: 1. *Raise*, 2. *PISTOL.*

At the command *raise*, unbutton the holster flap with the right hand and grasp the stock, back of the hand to the body.

At the command *pistol*, draw the pistol from the holster, reverse it, muzzle up, the hand holding the stock with the thumb and last three fingers; the little finger may be placed under the butt; forefinger outside of the guard; guard to the front; barrel nearly vertical; hand as high as the neck and 6 inches to the right and front of the right shoulder. This is the position of *raise pistol.*

97. Being at raise pistol: 1. *Return*, 2. *PISTOL.*

Insert the pistol in the holster, back of hand to the body, button the flap, and drop the hand by the side.

If the holster is so constructed that the butt is to the rear, raise and return pistol are executed as already prescribed, except that the back of the hand is to the right and the pistol is not reversed.

98. 1. *Inspection*, 2. *PISTOL.*

Execute raise pistol, except that the pistol is held about 6 inches in front of the center of the body, barrel up, pointing to the left front and upward at an angle of about 45°, wrist straight and as high as the breast. Cartridge boxes, if worn, are then opened with the left hand.

The instructor passes along the rank and examines the pistols and cartridge boxes; each box is closed as soon as inspected. To inspect the pistol minutely, he takes it in his hands and then returns it to the soldier, who grasps it at the stock and resumes *inspection pistol;* each man returns pistol as the inspector passes to the next. If the pistols are not inspected, they are returned by the commands: 1. ***Return,*** 2. ***PISTOL.***

For purposes of instruction the men may be required to execute *inspection pistol* simultaneously, suitable caution being given to that effect by the instructor. But at formal inspections the men execute *inspection pistol* in succession as the inspector approaches them.

99. Being at raise pistol: ***LOAD.***

Place the pistol at the cylinder in the left hand, latch up, barrel inclined to the left front and downward at an angle of about 30°; draw back the latch with the right thumb, push the cylinder out with the second finger of the left hand, and, if necessary, eject the empty shells by pressing the ejector with the left thumb, right hand steadying the pistol at the stock; take a cartridge from the belt or box, insert it in the chamber, press it home with the right thumb, and so on for each chamber to be loaded; close the cylinder with the left thumb so that the hammer will rest over the empty chamber and raise pistol.

Firings.

100. For single action. Being at raise pistol: 1. ***To the front*** (***right oblique,*** etc.); or, 1. ***At*** (such an object), 2. ***READY.***

Cock the pistol with the right thumb and direct the eyes to the front or toward the target.

101. 1. ***Squad,*** 2. ***FIRE.***

Thrust and point the pistol to the front or toward the target, arm nearly or quite extended, keeping the eyes on the object, and fire; resume the raise pistol.

To continue the firing in the same direction, or at the same target: 1. ***READY,*** 2. ***Squad,*** 3. ***FIRE.***

102. For double action. Being at raise pistol: 1. ***To the front*** (***right oblique,*** etc.), 2. ***Squad,*** 3. ***FIRE;*** or, 1. ***At*** (such an object), 2. ***Squad,*** 3. ***FIRE.***

Executed as in paragraph 101, except that at the command *fire,* the pistol is cocked by pressing steadily on the trigger.

103. An almost imperceptible pause may be allowed between the thrusting and firing, in which to correctly point the pistol. Deliberate aiming, however, should not be encouraged. After firing without cartridges, pause an instant to see if the pistol is correctly pointed, to get the personal error.

The instructor must take into account individual peculiarities in order to secure the best results in firing; in such cases departure from the text is permissible.

When mounted, lean slightly forward, bearing on the stirrups; in firing to the front, lean well to the right and slightly forward, to avoid burning or frightening the horse.

104. In a similar manner, the men will be instructed to fire to the left, right oblique, left oblique, right rear, left rear, and rear. When firing to the left, the pistol hand will be about opposite the left shoulder; when firing to the rear or right rear, the shoulders are turned about 45° to the right; when firing to the left and left rear, the shoulders are turned about 45° to the left.

105. The recruits are first taught the motions of loading and firing without using cartridges.

106. No cartridges will be used, except when indicated in the first command, thus: 1. ***With*** (so many) ***dummy (blank*** or ***ball) cartridges,*** 2. ***LOAD.***

107. To fire at will: 1. ***Fire at will,*** 2. ***To the front,*** etc.; or, 2. ***At*** (such an object), 3. ***COMMENCE FIRING,*** 4. ***CEASE FIRING.***

The soldier fires as rapidly as is consistent with careful pointing at each shot. The raise pistol is resumed after each shot.

At the command *cease firing,* the firing will stop, and the men resume the raise pistol.

108. The position taken in firing practice will be that prescribed in the Small-Arms Firing Manual. Preliminary instruction in the care and use of the revolver and position and aiming drills will be conducted in accordance with the principles explained in the Small-Arms Firing Manual.

109. Target practice will be conducted on the principles explained in the Small-Arms Firing Manual.

CHAPTER III.—THE BATTERY DISMOUNTED.

SECTION I.—*General provisions.*

110. The instruction prescribed for the battery dismounted is applicable, with obvious modifications, to the platoon dismounted, the section dismounted, and the gun squad dismounted. It is likewise applicable to the exercises of several ***gun squads dismounted.***

111. A ***section dismounted*** comprises all the men assigned to the service of a single piece and its caisson, or of two caissons. It consists of one sergeant, who is chief of section; two corporals; the cannoneers; the drivers of the carriages; and such mechanics, cooks, musicians, and reserve drivers and cannoneers as may be assigned to it for convenience of administration.

The men are permanently assigned to sections, and are transferred by order of the captain only; they may be temporarily attached to sections not their own, to equalize subdivisions at drill or other duty.

A section assigned to the service of a piece and its caisson is called a ***gun section;*** a section assigned to the service of two caissons is called a ***caisson section.***

112. A ***platoon dismounted*** consists of one lieutenant, who is chief of platoon, and two sections dismounted.

113. A ***battery dismounted*** comprises, on a peace footing, three platoons; on a war footing, four platoons.

114. The guides of a battery are the gunner and caisson corporal, posted on its right and left.

The guides of a section or of a gun squad are the gunner and the front rank man on the opposite flank.

115. Chiefs of platoon and section supervise the movements of their platoons and sections, but repeat or give commands only when prescribed.

116. ***File closers*** will rectify mistakes and insure steadiness and promptness in the ranks.

117. The battery is formed in double rank with the platoons and sections arranged from right to left in the order of their permanent numbers.

The senior lieutenant is assigned as chief of the first platoon, the lieutenant next in rank as chief of the second platoon, and so on.

The first four sections are *gun sections;* the others are *caisson sections.* The senior corporal in a gun section is the *gunner,* the junior corporal is the *caisson corporal;* in a caisson section the senior caisson corporal corresponds to the gunner in the gun section and has the same post in ranks.

SECTION II.—*Posts of officers, noncommissioned officers, etc.*

In Line.

118. The captain: Four yards in front of the center of the battery.

Chiefs of platoon: Two yards in front of the center of their platoons.

The fourth lieutenant, when there are but three platoons: In the line of file closers, opposite the center of the battery.

The first sergeant: In the front rank, 1 yard from the right of the first section.

The quartermaster and stable sergeants: In the front rank, 1 yard from the left of the left section, in order of rank from right to left.

Chiefs of section: One yard in front of the center of their sections.

Gunners: On the right of the front rank of their sections, not covered in the rear rank.

Caisson corporals: In the line of file closers, 1 yard in rear of the left file of their sections, except the caisson corporal of the left section, who is on the left of the front rank of his section, not covered in the rear rank.

The guidon: On the left of the front rank of the right center section, not covered in the rear rank.

The musicians: In the line of file closers in rear of the first section.

In Subdivision Column.

119. The captain: Four yards from the flank, opposite the center, on the left (right) when the right (left) is in front.

Chiefs of platoon: In platoon column, 2 yards in front of the center of their platoons; in section column, on the same side as the post prescribed for the captain, 2 yards from the flank, opposite the center of their platoons.

The fourth lieutenant, when there are but three platoons: On the side opposite the captain, 2 yards from the flank and opposite the center of the column.

The first sergeant: On the same side as the captain, aligned on the front rank of the nearest subdivision and 1 yard from it.

The quartermaster and stable sergeants: Abreast of each other as in line, and either 4 yards in front of the center of the leading subdivision or 4 yards in rear of the last subdivision, according as the column has been formed toward their flank of the battery or the flank opposite.

Chiefs of section, gunners, caisson corporals, guidon, and musicians: Same as in line, except that of the caisson corporal of the left section, who takes post 1 yard in rear of the left file of his section.

In Flank Column.

120. The posts are the same as when faced with the battery from line, except that in the case of the quartermaster and stable sergeants, the one in rear steps obliquely toward the side of the file closers and places himself abreast of the leading one.

SECTION III.—*To form the battery dismounted.*

121. At the sounding of the ***assembly,*** the first sergeant, facing the battery and 6 yards in front of where the center is to be, commands: 1. ***FALL IN,*** 2. ***CALL ROLLS,*** 3. ***REPORT.***

At the command ***fall in,*** the gunners place themselves on the line facing to the front in their proper order, at sufficient distance apart for the formation of their sections; the men of each section fall in on the left of their gunner, as prescribed in paragraph 72; the chiefs of section take their posts facing their sections. The assembly having ceased, the first sergeant causes the sections to close to the right, if necessary.

At the command ***call rolls,*** the chiefs of section call the rolls, and then face to the front.

At the command ***report,*** the chief of the first section salutes and reports: ***First section, present;*** or ***First section, Corporal ——— and Private(s) ——— are absent.*** The first sergeant, having received and verified the report, returns the salute with the right hand. The chief of the second section then reports in like manner, and so on. Men who are known to be absent by proper authority are not reported absent by the chiefs of section. After receiving the reports, the first sergeant faces about, salutes the captain, and reports: ***Sir, the battery is present or accounted for;*** or, ***Sir,*** (so many) ***noncommissioned officers or privates are absent.*** The first sergeant then takes his post.

The captain places himself about 12 yards in front of the center of the battery, superintends the formation, and receives the report of the first sergeant, whose salute he returns.

The lieutenants take their posts as soon as the first sergeant has reported.

During instruction, the officers have the saber drawn or in the scabbard, at the discretion of the captain. When the captain draws saber, the lieutenants also will draw saber.

To Open Ranks.

122. Being in line at a halt: 1. ***Open ranks,*** 2. ***MARCH,*** 3. ***FRONT.***

At the first command, the gunners and the left guide of the battery step backward 2 yards to mark the new alignment of the rear rank; the file closers step backward 2 yards in rear of this line. A lieutenant in the line of file closers takes post 4 yards in rear of the line of guides, opposite the center. The captain goes to the right flank and sees that the guides are on a line parallel to the front rank, then places himself facing to the left 4 yards in front of and 2 yards to the right of the battery, and commands: ***MARCH.***

At the command ***march,*** the chiefs of platoon step forward 2 yards, the chiefs of section 1 yard, and all dress to the right. The first sergeant faces about, places himself, facing to the left, on the line of the rear rank, aligns it, and then faces to the front; the front rank and file closers dress to the right; the rear rank steps backward, halts a little in rear of the line, and then dresses to the right.

The captain aligns the chiefs of platoon and section and the front rank, and verifies the alignment of the rear rank and file closers; the chiefs of platoon and section and the file closers turn their heads and eyes to the front as soon as their alignment is verified.

At the command ***front,*** the first sergeant, gunners, and left guide resume their posts; the captain places himself 6 yards in front of the center of the battery,

To Close Ranks.

123. Being at open ranks: 1. *Close ranks,* 2. *MARCH.*

At the command *march,* the lieutenants and chiefs of section resume their posts in line, the chiefs of platoon and section facing about; the rear rank closes to 1 yard, each man covering his file leader; the file closers close to 1 yard from the rear rank; the captain then takes his post.

Alignments.

124. The alignments are executed as prescribed for the squad, the guide being established instead of the base file. In aligning the battery, the captain places himself in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made; after commanding *front,* he resumes his post. This rule applies also to chiefs of platoon or section, when aligning their subdivisions.

To Dismiss the Battery.

125. Being in line at a halt:

The captain directs the first sergeant: *Dismiss the battery,* and returns the salute of the first sergeant.

The officers fall out; the first sergeant salutes, steps 3 yards to the front, faces to the left, and commands: *DISMISSED.*

In exceptional cases the battery may be dismissed from any formation, either at a halt or marching.

SECTION IV.—*Maneuvers of the battery dismounted.*

General Provisions.

126. The instruction set forth in detail for the soldier dismounted is applicable to the battery dismounted, the *facings, steps, marchings, turnings, rests,* etc., all being executed according to the same principles, officers, noncommissioned officers, and file closers conforming to the movements.

127. In the turnings the guide of the battery or subdivision on the flank toward which the battery or subdivision turns is the pivot man of the movement.

During the execution of a turn, as well as on halting after a turn, the men as they arrive abreast of the pivot man align themselves toward him without command.

In executing the turnings by battery, the first sergeant or the quartermaster and stable sergeants when on the marching flank, conform to the movement; when on the pivot flank they face to the rear at the command *march,* and place themselves on the line, facing in the new direction.

128. Whenever the battery in line is faced about or marched to the rear, all men in the front rank, not covered, step into the new front rank; the first sergeant and the quartermaster and stable sergeants place themselves in line with the new front rank, but do not change to the opposite flank. The chiefs of platoon and section and the file closers maintain their relative positions.

To Form or March in Subdivision Column from Line.

129. 1. *Platoons* (*Sections*) *right* (*left*), 2. ***MARCH,*** 3. *Battery,* 4. ***HALT;*** or, 3. *Full step,* 4. ***MARCH.***

At the first command each chief of subdivision cautions: *Platoon* (*Section*) *right;* at the second command each subdivision executes a turn on fixed pivot as explained in paragraph 92. The fourth command is given when all the subdivisions have completed the turn.

While marching in subdivision column the guide of each rear subdivision preserves the trace and step and a distance equal to the front of his subdivision. In obliquing the subdivisions remain parallel to each other and maintain their relative positions.

To Change Direction in Subdivision Column.

130. 1. *Column right* (*left*), 2. ***MARCH.***

At the first command the chief of the leading subdivision commands: *Right turn.*

At the command *march,* the leading subdivision turns to the right on a moving pivot, as explained in paragraph 93; its chief commands: 1. *Full step,* 2. ***MARCH,*** on completion of the turn, and announces the guide on the side it was previous to the turn, or repeats the instructor's command for the guide.

The rear subdivisions march squarely up to the turning point and change direction by command of their chiefs.

Column half right (*half left*) is similarly executed.

To Form Line of Subdivision Columns from Subdivision Column.

131. If marching: 1. *By the right* (*left*) *flank,* 2. *MARCH.* If halted: 1. *Right* (*left*), 2. *FACE,* 3. *Forward,* 4. *MARCH.*

The officers, noncommissioned officers, and file closers face with the subdivisions, and maintain their relative positions with respect to them; the guide at the head of each subdivision dresses toward the guide of the battery, and preserves the proper interval from that flank.

The march in column of subdivisions may be resumed by the same commands.

To Form Flank Column from Subdivision Column.

132. If marching: 1. *By the right* (*left*) *flank,* 2. *Platoons (Sections) column left (right),* 3. *MARCH.*

At the command *march,* each subdivision moves by the right flank, executes column left, and follows the subdivision which precedes it in the column.

If halted, the battery is first faced to the right (left) and then the second and third commands are given.

To Form Subdivision Column from Flank Column.

133. 1. *Platoons* (*Sections*) *column right* (*left*), 2. *MARCH,* 3. *By the left* (*right*) *flank,* 4. *MARCH.*

Executed simultaneously by all of the subdivisions. The fourth command is given after the change of direction is completed.

To Form Line from Subdivision Column.

134. 1. *Platoons* (*Sections*) *right* (*left*), 2. *MARCH,* 3. *Battery,* 4. *HALT;* or, 3. *Full Step,* 4. *MARCH.*

At the first command each chief of subdivision cautions: *Platoon* (*Section*) *right.* At the command *march,* each subdivision executes a turn on fixed pivot. The fourth command is given when the sections have completed the turn.

Before forming line the captain requires the guides of the rear subdivisions on the flank toward which the movement is to be executed to cover; if marching, he announces the guide on that flank, if not already there.

Route Order and at Ease.

135. Marching in flank column or section column: 1. ***Route Order,*** 2. ***MARCH;*** or, 1. ***At ease,*** 2. ***MARCH.***

The officers carry their sabers at will or in the scabbard; the men retain their positions in ranks, but are not required to keep step.

If the command be ***route order,*** the men are permitted to talk; if the command be ***at ease,*** silence is preserved.

To resume the cadenced step: 1. ***Battery,*** 2. ***ATTENTION.***

If the command ***halt*** be given while marching at route order, the men remain at rest in ranks; if while marching at ease, they remain at ease.

Route order and at ease are not used while marching in double time.

PART III.

FIRING INSTRUCTION.

CHAPTER I.—OBJECT AND SEQUENCE OF THE INSTRUCTION.

136. The objects of this instruction are:

1. To train the personnel in the mechanism of the methods of fire so that, at the word of command, fire of the desired nature may be delivered with certainty and celerity. (*Fire Discipline.*)

2. To train officers in the conduct of fire, so that they may be enabled to utilize the weapons at their disposal to the best advantage. (*Conduct of Fire.*)

A progressive order of instruction will be followed in each case.

Training in the elementary duties of the two kinds should be undertaken separately at first. Drill in the mechanism of fire is the essential feature of instruction of the first kind; practice in determining firing data and in adjusting fire under various assumed conditions, the essential feature of instruction of the second kind. As soon as the two kinds of instruction have sufficiently progressed, they should be combined and the training carried on, first in the park or on the drill ground, and then on terrain of every available description; targets representing as nearly as possible those to be met in service should be attacked, first by simulated fire, then with the service ammunition.

137. Training in fire discipline begins with the instruction of the *cannoneer,* passes to that of the *gun squad,* then to that of the *firing battery,* and then to that of the higher units.

The cannoneer must be taught to perform quickly and correctly the individual duties required of him in the service of the piece. He must acquire such a thorough knowledge of these duties and such a well-grounded habit of performing them properly that in the excitement of action their execution will be a matter of second nature to him.

The gun squad must be trained as a unit, so that its individual members work together smoothly, quietly, and effectively in serving the piece.

The instruction of the firing battery and of the higher units should secure the harmonious working of the organization as a whole in delivering fire as a single fire unit, thus enabling its commander, without confusion or delay, to turn the fire of his unit from point to point and to concentrate or distribute this fire in such manner as may be desirable.

All the personnel should receive this instruction.

CHAPTER II.—THE CANNONEER.

SECTION I.—*Method of instruction.*

138. For this instruction a few recruits (usually not more than six) are placed under the charge of an instructor, who, by simple directions, causes the gun and its caisson to be limbered or unlimbered and to be placed in such position as he may desire.

139. In view of the great importance of instruction of this character, it is begun as soon as the recruits have had a few drills in The Soldier Dismounted, and is continued, in addition to other instruction, until the cannoneers are thoroughly instructed and skilled in their individual duties.

140. The instruction involves acquiring:

First. An intimate knowledge of the matériel in use in the battery, the names of the different parts, their purposes, and methods of operation.

Second. Skill and dexterity on the part of the cannoneers in the performance of their duties.

Instruction of the first kind is imparted by careful and painstaking description on the part of the instructor, supplemented in each case, as far as practicable, by actual demonstration of the method of operation of the particular element of the matériel being described.

Instruction of the second kind is had by persistent drill in the prescribed duties and by continued practice with the various mechanisms under all possible conditions.

SECTION II.—*Preliminary instruction in matériel and in methods of fire.*

141. The instruction is carried on in the squad room, in the park, and elsewhere during the intervals of more advanced work.

This instruction is on such subjects as the following:

1. Nomenclature of the principal parts of the piece and caisson, and their respective equipments.
2. Operation of the different parts of the gun and carriage; for example, the method of controlling the recoil.
3. Sights and quadrants: Description and methods of operation.
4. Laying the gun: Principles on which the different methods are based and conditions under which they are used. Thus: (*a*) Laying by the sight for direction and by the quadrant for range; (*b*) laying by the sight for range and direction.
5. Powders: Kinds of powder used and their principal characteristics.
6. Projectiles: The different kinds and special uses of each.
7. Fuses: The different kinds and their mode of operation.
8. Methods of fire: Description of the different kinds and occasions in general when the different kinds are applicable.

SECTION III.—*Individual duties in the service of the piece (3-inch field gun).*

DUTIES IN GENERAL OF THE DIFFERENT CANNONEERS.

142. ***Gunner:*** Commanding the gun squad.
Laying the piece:
1. For direction only.
2. Both for range and direction when so ordered.

No. 1: Opening and closing the breech.
Laying the piece for range when so ordered.
Firing the piece.

No. 2: Giving the general direction to the piece.
Loading the piece.

No. 3: Keeping the fuse-setter scales set at the range and corrector ordered.

No. 4: Setting fuses and passing ammunition to No. 2.

No. 5: Passing ammunition from the chest to No. 4.

DUTIES IN DETAIL OF THE DIFFERENT CANNONEERS.

DUTIES OF THE GUNNER.

To Set the Deflection Scale of the Panoramic Sight.

143. The limb of the instrument is divided into 64 equal parts. The micrometer scale is divided into 100 equal parts, a complete turn of the micrometer corresponding to one division of the limb. The micrometer therefore serves to subdivide the divisions of the limb into 100 parts; hence, the least reading of the instrument is one sixty-four hundredth of the circumference, or one one-thousandth of the radius, very nearly. The least reading is called a "mil." A deflection of one mil corresponds, therefore, to a deviation at the target of one one-thousandth of the range.

To set off a deflection: The gunner turns the rotating head of the instrument until the number of hundreds of the setting is shown by the index of the limb, and the number of tens and units, if any, by the index of the micrometer.

If, in setting the deflection, the rotating head of the instrument has to be moved through a small angle only, the slow-motion screw is used. But if the reading given requires a large angular movement, the slow-motion mechanism is ungeared and the rotating head is turned around by hand. The slow-motion mechanism is then thrown in gear and used to set off the exact setting.

144. The gunner is repeatedly practiced in setting deflections by command. Thus, for example: ***Deflection, 1640.***

The gunner brings the index of the limb between the divisions marked 16 and 17 on the limb; then turns the micrometer until its index reads 40.

The instructor verifies the correct setting of the sight.

145. When numbers are announced as a part of a command, they are habitually announced thus:

25	Twenty-five.
400	Four hundred.
705	Seven hundred and five.
860	Eight sixty.
3805	Thirty-eight hundred and five.
4000	Four thousand.
4135	Forty-one thirty-five.
5050	Five thousand and fifty.

But when the telephone is used for the transmission of firing data, the rules laid down in paragraph 796 will govern.

To Set the Deflection Scale of the Peep Sight.

146. The graduations on the deflection scale of the peep sight correspond to those on the panoramic sight, the unit of the scale being one mil. When set at 0 (6400) the line of sight is parallel to the line of fire. Toward the left the readings increase, the maximum reading being 45 mils; toward the right the readings decrease, the minimum reading being 6355 mils.

To set off a deflection: The gunner turns the deflection screw head until the index is opposite the desired graduation.

He is practiced in setting off deflections as before.

To throw the projectile to the left, increase the deflection; to throw it to the right, diminish the deflection.

To Set the Sight for Range.

147. The range scale is graduated from 0 to 6250 yards, the least reading being 50 yards. The scale may be readily set by the eye to read to 25 yards.

To set off a range: The gunner moves the sight shank up or down in its socket until the desired graduation is opposite the index.

The sight shank is moved up or down by means of a scroll gear. If a considerable movement of the shank is necessary this mechanism is ungeared by drawing outward the scroll-gear handle with the right hand; the shank is then raised or lowered with the left hand until the desired graduation is near the index. The mechanism is then thrown in gear and utilized to set the scale at the exact setting desired.

148. The gunner is practiced in setting the sight for range, thus: The sight being in its socket, the instructor commands, for example, *Range, 2700.*

The gunner sets the sight as just described, and the instructor verifies the setting.

To Correct for Difference of Level of Wheels.

149. The gunner centers the bubble of the cross level by turning the leveling screw on the sight bracket.

To Lay the Piece.

150. ***For both range and direction:*** When it is possible for the gunner to see the target clearly and to aim directly upon the part of it which the fire of his gun is intended to reach, the gun is ordinarily laid by the gunner both for range and direction. This is called *direct laying.*

The designation *target* (so and so) is the indication that this method of laying is to be employed.

The gunner causes a cannoneer, working at the trail handspike and sighting over the line sights, to give the piece the general direction. The gunner seats himself astride the seat on the left side of the trail; sets the deflection scale at the deflection ordered, using either the peep or panoramic sight, as may be required by the circumstances; sets the range scale at the range ordered; corrects for difference of level of wheels; operates the elevating and traversing apparatus so as to bring the line of sight upon the target; calls *ready* when the gun is laid.

151. The gunner may be practiced in this duty as follows:

The gunner being at his post at the piece unlimbered, the sights in their sockets, the instructor commands, for example:

1. *Target, that gun.*
2. *Deflection, 10.*
3. ***RANGE, 2400.***

1. At the indication of the target the gunner causes the piece to be pointed at it.
2. Seats himself astride of the gunner's seat, the left foot to the front, the right to the rear.
3. Sets off the deflection ordered.
4. Sets off the range ordered.
5. Corrects for difference of level of wheels.
6. Operates the elevating and traversing apparatus, so as to bring the line of sight upon the target.
7. Calls *ready* when the gun is laid, and takes his post.

The instructor verifies the sight settings, the centering of the bubble of the cross level, and sees that the gun is laid accurately upon the target.

NOTE.—When firing at stationary targets, the gunner should traverse the gun approximately to the middle point of traverse before the general direction is given from the end of the trail.

152. ***For direction only:*** When it is impracticable for the gunner to aim directly upon the part of the target which the fire of his gun is intended to reach, the gun is laid by him for direction only. In this case, an aiming point which can be clearly seen by the gunner is designated and a suitable deflection given, such that, when the line of sight is directed upon the aiming point, the gun will be directed upon the target. This is called ***indirect laying.***

The designation ***aiming point*** (so and so) is the indication that this method of laying is to be employed.

The gunner sets off the deflection, sights along one of the side faces of the rotating head of the panoramic sight, and causes a cannoneer at the trail handspike to move the trail to the right or left until the sight is aligned approximately on the aiming point.

The gunner then seats himself astride the gunner's seat, sets off the range, corrects for difference of level of wheels, and, looking through the panoramic sight, traverses the piece until the vertical cross hair is on the aiming point.

If the aiming point can not be seen on account of the shield, the gunner turns down the top shield.

The gunner must be careful not to touch the elevating gear in this method of laying.

153. The gunner may be practiced in this duty as follows:

The gunner being at his post at the piece unlimbered, the sights in their sockets, the instructor commands, for example:

1. ***Aiming point, the chimney on that white house.***
2. ***Deflection, 240.***
3. ***RANGE, 3300.***

1. At the indication of the deflection the gunner sets it off on the panoramic sight.
2. Causes the trail to be shifted until the rotating head of the sight is directed upon the aiming point.
3. Seats himself astride the gunner's seat.
4. Sets off the range ordered.
5. Corrects for difference of level of wheels.
6. Traverses the gun until the vertical cross hair is on the aiming point.
7. Calls ***ready*** when the gun is laid in direction, and takes his post.

The instructor verifies the sight setting, the centering of the bubble of the cross level, and sees that the sight is accurately directed upon the aiming point.

Before giving the command for this exercise the instructor should cause the piece to be elevated approximately for the range of the target, using the quadrant for this purpose.

To Measure the Deflection of a Target from an Aiming Point.

154. The gun being laid directly on the target with zero deflection: The gunner turns the rotating head of the panoramic sight until the vertical cross hair is on the aiming point; the reading of the instrument is then the deflection sought.

155. The gunner may be practiced in this duty as follows:

The gun being laid in direction on any target, with zero deflection and the gunner seated astride the seat, the instructor commands, for example:

1. *Aiming point, that clock tower.*
2. *MEASURE THE DEFLECTION.*

1. The gunner turns the rotating head of the panoramic sight until the vertical cross hair is on the designated aiming point.

2. He then reads and announces the deflection, thus: *Deflection, 490.*

The instructor verifies the reading and sees if the sight is accurately directed upon the aiming point.

DUTIES OF NO. 1.

To Open the Breech.

156. No. 1 grasps the operating lever with his left hand and compresses the lever latch. He then draws the lever to the rear and right, thus swinging the block to the right.

To Close the Breech.

157. No. 1 grasps the operating lever with his left hand, pushes the lever to the left, and swings the block smartly to its seat.

To Set Off an Angle of Site.

158. The clinometer of the range quadrant consists of the limb and the micrometer. The limb is graduated in divisions of 100 mils each. The divisions are marked 2, 3, 4; but they are to be read 200, 300, 400 mils. The micrometer is a beveled disk at the upper end of the clinometer level screw; its periphery is divided into 100 equal parts, and, as one complete turn of the level screw moves the index of the limb over one division or 100 mils, the least reading of the micrometer is 1 mil.

The graduation 3 (or 300) on the scale corresponds to targets which are on the same level as the gun. Angles of site greater than 300 correspond to targets above the level of the gun and those less than 300 to targets below that level. A variation of 1 mil in the angle of site corresponds to a difference of level of $\frac{1}{1000}$ of the range.

To set off an angle of site: No. 1 turns the clinometer level screw so that the index of the limb shows the number of hundreds of the setting, and the index of the micrometer shows the number of tens and units of the setting.

159. No. 1 may be practiced in this duty as follows:

The quadrant being in or out of its socket, the instructor commands, for example: *Angle of site, 315.*

No. 1 turns the clinometer level screw until the index of the limb is between the graduation marked *3* and the graduation marked *4*, and the index of the micrometer reads *15*.

The instructor verifies the setting.

To Set the Quadrant for Range.

160. The range disk of the quadrant is graduated from 0 to 6,500 yards, the least reading of the scale being 50 yards. A given range is set off by turning the handwheel until the index is brought opposite the designated reading. If a considerable change of reading has to be effected, the slow-motion mechanism is ungeared by drawing out the handwheel. The index is then turned quickly to the vicinity of the desired setting; by releasing the tension on the handwheel the slow-motion mechanism is then thrown in gear and used to effect an accurate setting.

161. No. 1 may be practiced in this duty as follows:

The quadrant being in or out of its socket, the instructor commands, for example: *Range, 2550.*

No. 1 manipulates the handwheel, as above described, until the index is brought opposite the designated reading.

The instructor verifies the setting.

To Correct for Difference of Level of Wheels.

162. The quadrant being in its socket, No. 1 centers the bubble of the cross level by turning the level screw.

To Lay the Piece for Range.

163. In indirect laying, the piece is habitually laid for range by No. 1, while the gunner lays for direction only.

No. 1 sets off the angle of site, sets the quadrant for range, corrects for difference of level of wheels, then centers the bubble of the clinometer level by turning the elevating crank.

164. No. 1 may be practiced in this duty as follows:

The quadrant being in its socket, and No. 1 sitting astride the seat on the right side of the trail, facing the carriage, the instructor commands, for example:

1. *Angle of site, 280.*
2. *Range, 3400.*

As the data are announced, No. 1:

1. Sets off the angle of site.
2. Sets the quadrant for range.
3. Corrects for difference of level of wheels.
4. Centers the bubble of the clinometer level by turning the elevating crank.
5. Calls *set* when the piece is correctly laid, and takes his post.

The instructor verifies the quadrant settings and the centering of the bubbles.

To Measure the Angle of Site.

165. The angle of site of any designated target may be measured by sighting directly on the target with the sight set at any convenient range; then setting the quadrant range disk for the same range, turning the clinometer level screw so as to center the bubble of the clinometer level, and taking the reading of the clinometer scales.

166. No. 1 may be practiced in this duty as follows:

Having caused the piece to be accurately laid on the target by means of the sight set at any convenient range, the instructor commands, for example:

1. *Range, 2700.*
2. *MEASURE THE ANGLE OF SITE.*

At the last command, No. 1:

1. Sets off the range on the range disk.
2. Corrects for difference of level of wheels.
3. Centers the bubble of the clinometer level by turning the clinometer level screw.
4. Calls out the angle of site as soon as measured, thus: ***Angle of site 330,*** and takes his post.

The instructor verifies the quadrant settings and the centering of the bubbles.

To Fire the Piece.

167. The piece being loaded and laid, the instructor commands ***Ready.*** At this command, No. 1 grasps the firing handle with the left hand. At the command: 1. ***No. 1*** (or such number), 2. ***FIRE,*** No. 1 draws the handle smartly downward so as to trip the trigger arm.

NOTE.—It is most important that No. 1 should become habituated to firing with the left hand, as the danger of firing while the hand is on the operating lever is thus obviated.

DUTIES OF NO. 2.

To Give the General Direction to the Piece.

168. No. 2 is practiced in pointing the piece quickly and accurately upon different objects. For this purpose, he stands at the left of the trail handspike, grasps its end with the right hand, its middle with the left, looks along the line sights and shifts the trail to the right or left so as to direct the gun upon the target.

169. The instructor commands, for example:

1. ***Target, that blockhouse.***
2. ***AIM.***

No. 2 takes the position above described, points the piece quickly on the object designated, and resumes his post.

The instructor verifies the pointing.

To Load the Piece.

170. No. 2 receives a round of ammunition from No. 4 and inserts it in the chamber. While so doing, he stands in the most convenient position to reach the round which is passed to him on the one side, and to insert it in the chamber on the other. He takes care to stand clear of the breech during recoil.

In loading the piece, No. 2 holds the middle of the projectile in his left hand, the base of the cartridge case with his right. He inserts the head of the projectile in the chamber and then shoves it smartly forward. The closing of the breechblock insures the proper seating of the projectile.

171. Except in rapid fire, No. 2 receives the empty cartridge cases as they are ejected from the piece, and passes them to No. 4 or No. 5, as may be most convenient, to be placed in the ammunition chest. In rapid fire, the cases are picked up and stored when opportunity offers.

172. When using drill cartridges, No. 2 always receives the cartridge as it is ejected and passes it to No. 4 or No. 5.

DUTIES OF NOS. 3, 4, AND 5.

173. Nos. 3, 4, and 5 serve ammunition. The special duty of No. 3 is to keep the fuse setter scales set at the readings ordered; that of No. 4 to set fuses and pass ammunition to No. 2; and that of No. 5 to take the rounds from the chest and pass them to No. 4.

174. While serving ammunition, Nos. 3, 4, and 5 take the positions best suited to performing their special duties and to securing the maximum protection from the caisson and shield.

175. Nos. 3, 4, and 5 should be trained to perform one another's duties so that in action they may relieve one another from time to time. After being thoroughly instructed in their individual duties, they should be drilled together, it being most important to develop: (1) accuracy and rapidity in the setting of fuses; (2) a quick and orderly method of passing ammunition from hand to hand.

To Set the Fuse-Setter Scales.

176. The fuse setter has a range scale and a corrector scale.

The range scale is graduated in yards from 0 to 6,500, its least reading being 50 yards.

The corrector scale is graduated uniformly into 60 divisions, numbered 0, 10, 20, * * * 60. Under normal conditions a change of fuse setting by one unit of this scale changes the time of burning of the fuse so as to produce a variation in the height of burst of the projectile of one mil. Corrector 30, the middle graduation of the scale, corresponds theoretically to the normal height of burst (3 mils).

177. *Increasing the corrector shortens the time of burning of the fuse and hence increases the height of burst of the projectile; decreasing the corrector lengthens the time of burning of the fuse and hence decreases the height of burst of the projectile.*

The corrector scale thus affords the means of correcting the observed error in height of burst and adjusting the mean point of burst at the normal height.

178. To set the instrument, the instructor announces the corrector and the range; No. 3 turns the corrector worm so as to bring the movable index opposite the corrector reading ordered; he then turns the range worm so as to bring the range reading opposite the fixed index of the range scale.

No. 3 may be practiced in this duty as follows:

The instructor commands for example:

Corrector, 25.
RANGE, 2900.

No. 3:

1. Sets off the corrector ordered.
2. Sets off the range ordered.

The instructor examines and verifies the settings.

To Set Fuses:

179. To set a fuse, insert the point of the projectile in the bracket fuse setter; holding the body of the projectile down upon the guide, and pressing the point firmly into the fuse-setter socket, turn the projectile to the right until the lug on the fuse strikes the permanent stop in the fuse setter.

No. 4 may be practiced in the duty of setting fuses by causing an extra cannoneer (representing No. 5) to pass projectiles to him, requiring No. 4 to set the fuse, and then to pass the projectile to another cannoneer occupying the position of No. 2. Or Nos. 2, 3, 4, 5 may to great advantage be trained together in their combined duties in the service of ammunition.

If the hand fuse setter is used instead of the bracket fuse setter, it is employed in a manner similar to that described above; No. 5 passing the projectile to No. 4, and No. 4 holding the projectile so that No. 3 may operate the fuse setter.

CHAPTER III.—THE GUN SQUAD.

SECTION I.—*General provisions.*

180. As soon as the cannoneers have been instructed in their individual duties, they are taught to work together as a ***gun squad.***

181. The efficient service of the gun depends upon the orderly cooperation of the members of the gun squad, as well as upon the skill of the individual cannoneers. The habit of combined effort must hence be acquired.

182. An alert and soldierly manner is exacted of the cannoneers, and they should be taught to perform their duties as briskly and rapidly as is consistent with efficient service.

SECTION II.—*Dispositions and exercises incidental to the service of the piece.*

Composition of the Gun Squad.

183. The cannoneers assigned to the service of a gun section constitute a ***gun squad.***

184. For the service of the three-inch field gun, the squad is ordinarily composed of two corporals and not less than five privates. The senior corporal is the ***gunner;*** the junior the ***caisson corporal.***

185. The cannoneers assigned to the service of a caisson section constitute a ***caisson squad.*** It consists of two corporals and such number of cannoneers as may be assigned. The senior corporal is caisson corporal of the ***first caisson*** (par. 646) of the section; the junior, of the ***second caisson*** of the section. Instructions prescribed for the gun squad apply also to the caisson squad, with obvious modifications—the senior caisson corporal performing the duties prescribed for the gunner, as far as practicable.

Formation of the Gun Squad.

186. The gun squad is formed in double rank in the following order from right to left: No. 1 on the right of the front rank; No. 2 in rear of No. 1; No. 3 on the left of No. 1; No. 4 on the left of No. 2; and so on—the odd numbers in the front rank and the even numbers in the rear rank. The gunner is on the right and the caisson corporal on the left of the front rank, both uncovered in the rear rank.

If there is an odd number of cannoneers the highest odd number is covered by the highest even number.

C. C.	7	5	3	1	G.

1 yard.

6		4	2

187. The caisson squad is formed in double rank as follows: Nos. 4, 5, 6, 7, etc., of the first caisson, in the front rank in the order named from right to left, covered in the rear rank by Nos. 4, 5, 6, 7, etc., of the second caisson. The senior corporal is on the right and the junior corporal on the left of the front rank, both uncovered in the rear rank.

If there are more cannoneers in the rear rank than in the front rank the highest numbered cannoneer in the rear rank steps into the front rank and is covered by the next highest number.

C. C.	7	6	5	4	C. C.

1 yard.

7	6	5	4

188. At mounted formations the caisson corporals are ordinarily mounted, and are posted as described in The Battery Mounted (par. 663).

189. When thoroughly instructed the men are permanently assigned to the duties for which they are best fitted.

To Form the Gun Squad.

190. The instructor indicates the place of formation and commands: ***FALL IN.***

The gunner repeats the command and hastens to place himself where the right of the squad is to rest, faced in the proper direction.

The cannoneers move at double time and form in line on the left of the gunner in two ranks.

191. The place of formation is indicated and the command given thus, for example: 1. *In front* (*rear*) *of the piece* (*caisson*), 2. ***FALL IN;*** or, 1. *On the right* (*left*) *of the gun facing toward it,* 2. ***FALL IN.***

192. In case the front or rear of one of the carriages is designated the squad falls in at its post (pars. 196 and 197).

To Tell Off the Gun Squad.

193. ***CALL OFF.***

The cannoneer on the right of the front rank calls off *one;* the cannoneer on the right of the rear rank, *two;* the cannoneer on the left of No. 1, *three;* and so on; the gunner and caisson corporal do not call off.

194. In a caisson squad the cannoneers of the front rank call off first, thus: *Four, five, six,* etc., in order from right to left; followed in the same order by the cannoneers of the rear rank.

195. After having called off, the cannoneers fall in at once in their proper order, if a subsequent formation is ordered.

Posts of the Gun Squad, Carriages Limbered.

196. *In front of the piece or caisson.* The squad is in line facing to the front, its rear and center 2 yards from the end of the pole or from the heads of the lead horses.

197. *In rear of the piece or caisson.* The squad is in line facing to the front, its front and center 2 yards from the muzzle, or the rear of the caisson.

198. If no special place of formation is designated, the squad, when formed at the carriages, is posted in front of the leading carriage.

To Post the Gun Squad.

199. The squad is marched to the park, and, on arrival near the carriages, the instructor commands: ***Squad in front* (*rear*) *of your piece* (*caisson*).**

The gunner marches the squad to the carriage and posts it in the indicated position.

NOTE.—The instructor habitually causes the squad to approach the front (rear) of the carriage which he designates in his command, from the right flank if left in front and from the left flank if right in front.

Posts of the Cannoneers, Carriages Limbered.

200. The gunner and No. 1 opposite the rear of the limber wheels of the piece.

Nos. 2 and 3 opposite the front of the gun wheels.

Nos. 4 and 5 opposite the rear of the caisson wheels.

Nos. 6 and 7 opposite the front of the limber wheels of the caisson.

Nos. 8 and 9 opposite the middle of the pole of the caisson.

If the caisson corporal be present, dismounted, he is opposite the end of the pole of the caisson.

The gunner and even numbers are on the right, the caisson corporal and odd numbers on the left; all 2 feet outside the wheels, facing the front.

If numbers higher than No. 9 are present, they are assigned posts by the instructor.

To Post the Cannoneers.

201. 1. ***Cannoneers,*** 2. ***POSTS.*** The gunner repeats the command ***posts.*** The cannoneers leave the ranks, if formed, and move at double time by the shortest practicable routes to their posts at the carriage.

For preliminary instruction, the squads, on entering the park, are first posted with their carriages; the cannoneers are then sent to their posts by the foregoing command. The command is general, however, and is applicable when the cannoneers are in or out of ranks, at a halt or marching, and when the carriages are limbered or unlimbered.

To Mount the Cannoneers on the Carriages Limbered.

202. The gunner and No. 1 mount on the limber chest of the piece.

Nos. 2 and 3 mount on the axle seats.

Nos. 4 and 5 mount on the caisson chest.

Nos. 6 and 7 mount on the limber chest of the caisson.

No. 8 mounts between Nos. 6 and 7.

No. 9 mounts between Nos. 4 and 5.

The gunner and even numbers mount on the right side of their respective carriages, odd numbers on the left.

The instructor gives special directions for mounting cannoneers not herein provided for.

203. 1. ***Cannoneers, prepare to mount,*** 2. ***MOUNT.***

At the first command, the cannoneers who mount on the limber chests or axle seats hasten to the rear of the limber chests or axle seats; those who mount on the caisson chest hasten to the front of that chest. Each cannoneer who mounts on the limber chest places the foot nearest the wheel on the step, grasps the chest handle with the hand nearest the wheel, and with the other hand grasps the hand of the cannoneer opposite him. Each cannoneer who mounts on the caisson chest places the foot nearest the wheel on the step, and grasps the chest handle with the hand nearest the wheel. Cannoneers who mount on the axle seats place the foot nearest the wheel on the brake beam, and grasp the seat handle with the hand nearest the wheel.

At the command *mount,* all spring up and seat themselves, those on the chests facing to the front, those on the axle seats to the rear. Those who mount on the limber chests place the foot farthest from the wheel on the top of the limber chest, and then step down on the footboard.

204. If the command be: 1. ***Cannoneers,*** 2. ***MOUNT,*** the cannoneers execute, at the command *mount,* all that has been prescribed for the commands *prepare to mount* and *mount.*

To Dismount the Cannoneers from the Carriages.

205. 1. ***Cannoneers, prepare to dismount,*** 2. ***DISMOUNT.***

The cannoneers on the chests stand up on the footboards at the first command; at the second command all the cannoneers jump to the ground and take their posts.

206. If the commands be: 1. ***Cannoneers,*** 2. ***DISMOUNT,*** they execute, at the command ***dismount,*** all that has been prescribed for the commands ***prepare to dismount*** and ***dismount.***

To Move by Hand the Carriages Limbered.

207. ***To the front:*** 1. ***Piece*** (***Caisson***) ***forward,*** 2. ***MARCH,*** 3. ***HALT.*** At the first command the gunner and No. 1 hasten to the end of the pole; Nos. 2 and 3 to the limber wheels; Nos. 4 and 5 to the rear wheels; higher numbered cannoneers to the rear of the carriage, the gunner and even numbers working on the right side of the carriage, odd numbers on the left. The cannoneers who work at the pole or at the wheels grasp the same with both hands; those in rear of the carriage prepare to push against the most convenient part of the carriage.

At the command ***march,*** all assist in moving the carriage to the front. At the command ***halt,*** the carriage is stopped, the pole is lowered to the ground, and all resume their posts.

208. ***To the rear:*** 1. ***Piece*** (***Caisson***) ***backward,*** 2. ***MARCH,*** 3. ***HALT.*** Executed as in the preceding paragraph, except that at the command ***march*** the cannoneers move the carriage to the rear and that the higher numbered cannoneers place themselves in front of the rear axle of the carriage and push against the most convenient part of the carriage.

Posts of the Cannoneers, Carriages Unlimbered.

209. The gunner, immediately in rear of the cannoneer's seat, on the left side of the trail of the gun.

No. 1, immediately in rear of the cannoneer's seat, on the right side of the trail of the gun.

No. 2, 2 feet in rear of the gunner, covering him.

Nos. 3, 4, and 5, 2 feet in rear of the caisson chest in the order named from right to left.

Nos. 6 and 7, 2 feet in rear of the limber chest of the caisson, No. 6 on the right.

Nos. 8 and 9, 2 feet in rear of the limber chest of the piece, No. 8 on the right.

The caisson corporal, if present, dismounted, is 4 feet in rear of the middle of the limber chest of the caisson.

Higher numbered cannoneers, if present, are posted at the discretion of the instructor. Unless otherwise directed, the

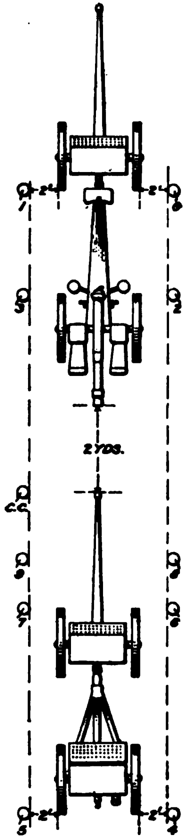


PLATE 12, Par. 200.

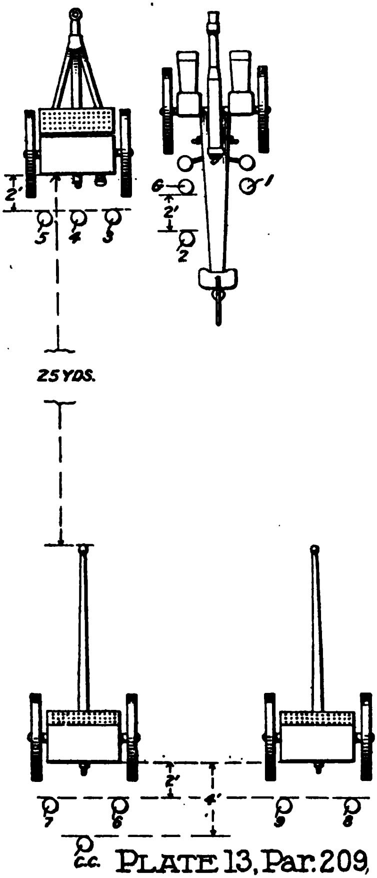


PLATE 13, Par. 209.

cannoneers, when not serving the piece, stand at attention at their posts, facing to the front.

210. When serving the piece, in either actual or simulated firing, the gunner and No. 1 habitually seat themselves on the seats provided for them; Nos. 3, 4, and 5 kneel behind the caisson.

To Change the Posts of the Cannoneers.

211. In order to exercise the cannoneers in all duties connected with the service of the piece, the posts of the cannoneers are frequently changed.

212. The cannoneers being at their posts, carriages limbered or unlimbered: 1. *Change posts,* 2. ***MARCH.***

No. 1 takes the post of No. 2; No. 2 of No. 3; No. 3 of No. 4; No. 4 of No. 5; No. 5 of No. 1.

213. The gunner should be changed frequently with the caisson corporal, in order that the latter may be thoroughly trained in the duties of gunner.

Disposition of the Carriages Before and After Unlimbering.

214. *Before unlimbering:* The piece and its caisson are placed abreast of each other, 2 yards apart, poles pointing in the same direction. This formation of the carriages is called a *double section.*

215. If it is intended to fire to the front, the caisson is placed on the left of its piece; if to the rear, on the right of its piece; if to the flank, on either side of the piece.

216. When not horsed, the carriages are drawn by the cannoneers and the instructor gives the necessary instructions for moving the carriages by the shortest routes into the prescribed positions.

217. *After unlimbering:* The adjacent wheels of the gun and caisson are about 1 foot apart, the gun muzzle and the caisson trail pointing to the front, the gun on the right and slightly in advance of the caisson.

The gun is placed slightly in advance to allow for recoil at the first shot, which on ordinary ground is about 10 inches.

218. In active service, and in instruction simulating service conditions, the limbers are placed under cover in the vicinity of the position; if no cover is obtainable in the vicinity, they are placed in line in rear of either flank at such place as the instructor may designate.

219. On occasions of ceremony, or when a post on the flank is not designated, the caisson limber is placed directly in rear of its caisson, the heads of the lead horses (or the end of the pole) 25 yards in rear of the caisson, facing to the front. The piece limber is placed on the right of the caisson limber, 2 yards from and abreast of it.

Preparation for Action.

220. The carriages being either limbered or unlimbered: *PREPARE FOR ACTION.*

The gunner releases the traversing and elevating lock and operates the traversing and elevating apparatus; removes the hood from the sight standard; takes the sights from their cases and places them in their sockets. Assisted by No. 1, he raises the top shield and fastens it.

No. 1 removes the quadrant from its case and places it in its seat; operates the breech, examines the bore, the breechblock, and the chamber, cleaning with a wiping cloth any parts requiring it; equips himself with a lanyard and assists the gunner in raising the top shield.

No. 2 removes the breech cover, assists in lowering the apron, and distributes tow or waste to the cannoneers for use in their ears.

No. 3 removes the muzzle cover, adjusts the front sight in the firing position, and assists in lowering the apron.

Nos. 4 and 5 lower the caisson apron.

The cannoneers report to the instructor if any parts of the matériel are not in working order.

221. The command *prepare for action* is always given before firing and at such other times as may be necessary for instruction.

If the command *prepare for action* be given before reaching the firing position and the ground to be traversed is rough, the captain should direct that the rear-sight shank be inserted in its socket, but that the panoramic sight and range quadrant be left in their cases, the latter unlocked. (See also par. 247.)

To Unlimber.

GENERAL RULES.

222. 1. In unlimbering to fire to the front, the caisson establishes the position.

2. In unlimbering to fire to the rear, the piece establishes the position.

3. In unlimbering to fire to the flank, the element (gun or caisson) on the side toward which fire is to be directed establishes the position.

4. If the carriages, after unlimbering, have to be moved by hand to the firing position, all the cannoneers of the gun squad assist at each carriage in turn in running it to the designated position.

5. When cannoneers higher in number than No. 5 are present, they habitually assist in unlimbering the carriages and in moving them, when necessary, to the firing position, after which they take post with the limbers.

6. If the carriages are not horsed, they are unlimbered successively, the one which establishes the position being unlimbered first. The limbers are drawn by cannoneers designated by the instructor. Thus, if only the gunner and five cannoneers are present, the cannoneers posted with the piece may be required to move the limber of the caisson, and those with the caisson, the limber of the piece. If higher numbered cannoneers are present, however, they are ordinarily used for this purpose.

To Fire to the Front.

223. The caisson being on the left of the piece, 2 yards from and abreast of it: ***ACTION FRONT.***

If marching, the carriages halt at the command. The cannoneers, if mounted, dismount.

The caisson: No. 4 sets the brake and unlatches the pintle. No. 5 lowers the prop. Nos. 4 and 5 raise the trail from the pintle, and No. 4 commands: ***DRIVE ON;*** they then lower the trail until the prop rests on the ground. Nos. 4 and 5 raise the door of the caisson chest, No. 4 adjusts the fuse setter in its position for use, and both take their posts at the caisson unlimbered.

The piece: The gunner unlatches the pintle, and, assisted by No. 1, lifts the trail; he then commands: ***DRIVE ON.*** The gun is then turned around 180°, the trail being carried away from the caisson; the gunner and No. 1 work at the end of the trail; Nos. 2 and 3 at the wheels nearest their respective posts, No. 2 turning toward the muzzle, No. 3 toward the trail. The gunner causes the piece to be placed by the side of the caisson in the position prescribed in paragraph 217. No. 2 turns back the trail handspike, and all take their posts at the carriages unlimbered.

Limbers: At the command *drive on,* the limbers take their prescribed positions (pars. 218 and 219). To take posts in rear of the carriages, the caisson limber executes a left about, moves straight to the rear, executes another left about, and halts so that the heads of the lead horses or the end of the pole will be 25 yards from the rear of the caisson. The piece limber follows the caisson limber, passes around in rear of it, and halts so as to be abreast of it and 2 yards to its right.

To Fire to the Rear.

224. The caisson being on the right of the piece, 2 yards from and abreast of it: ***ACTION REAR.***

Executed like *action front,* with the following modifications: As soon as the piece is unlimbered its trail is lowered to the ground; Nos. 2 and 3 run to the right and left caisson wheels, respectively. The caisson is turned around 180°, its trail being carried away from the piece; Nos. 4 and 5 working at the trail, No. 2 turning from and No. 3 toward the trail. The caisson is placed by the side of the piece in the position prescribed in paragraph 217.

Limbers: To take post in rear of the carriages, the caisson limber inclines well to the right, moves to the rear, executes a left about, and halts so that the heads of the lead horses or the end of the pole will be 25 yards from the rear of the caisson. The piece limber follows the caisson limber, passes around in rear of it, and halts so as to be abreast of it and 2 yards to its right.

To Fire to the Flank.

225. The caisson being on either side of the piece, 2 yards from and abreast of it: ***ACTION RIGHT*** (***LEFT***).

Executed according to the principles of *action front* and *action rear,* with the following modifications: After the carriages are unlimbered the muzzle of the gun and the trail of the caisson are turned in the direction of fire, and the carriage in rear is run up to its proper position on the line. The carriage on the side toward which fire is to be delivered is first established in position, and then all the cannoneers assist in bringing up the carriage in rear to its proper place.

Limbers: To take post in rear of their carriages, the limber farthest from the flank toward which fire is to be delivered moves out first, wheels away from the direction of fire, and after having gained sufficient distance to the rear executes an about and halts at the prescribed position in rear. The other limber follows and takes its position in a similar manner.

To Move by Hand the Carriages Unlimbered.

226. 1. *Piece* (*Caisson*) *forward* (*backward*), 2. ***MARCH,*** 3. ***HALT.***

The ***piece:*** The gunner and No. 2 grasp the trail handles, the gunner the left, No. 2 the right handle; Nos. 1 and 3 the right and left wheels, respectively; Nos. 4 and 5 place themselves so as to work advantageously at the breech of the gun in moving forward, at the muzzle in moving backward. At the command ***march,*** all working together move the carriage in the direction indicated. At the command ***halt,*** they stop the carriage and resume their posts.

The ***caisson:*** Executed as explained for the piece, except that Nos. 4 and 5 are at the trail of the caisson and that the gunner and No. 2 work in rear of the caisson chest in moving to the front, against the footboards in moving to the rear.

To Resume the Order for Marching.

227. The carriages being prepared for action, either limbered or unlimbered: ***MARCH ORDER.***

The gunner replaces the sights; secures the hood over the sight standard; traverses and depresses the piece to zero; fastens the traversing and elevating lock; assisted by No. 1, he lowers the top shield and secures it.

No. 1 removes the quadrant and puts it in its case; releases the brake, if set; assists in lowering the top shield, and replaces the lanyard in the trail box.

No. 2 turns back and secures the trail handspike, puts on the breech cover, and assists in raising and securing the apron.

No. 3 puts on the muzzle cover, adjusts the front sight in its traveling position, and assists in raising and securing the apron.

No. 4 secures the fuse setter in its traveling position. Nos. 4 and 5 close and secure the caisson door and raise and secure the caisson apron. All the cannoneers resume their posts.

To Limber.

228. *To the front and rear:* 1. *Limber,* 2. ***FRONT AND REAR.***

The gunner and No. 1 face to the rear at their posts; No. 2 places himself on the right of the gunner; No. 3 places himself on the left of No. 1; Nos. 4 and 5 hasten to the front of the caisson and lower the trail to the ground; No. 4 releases the brake; No. 5 secures the prop in its traveling position; Nos. 4 and 5 then place themselves with their backs toward the chest, No. 4 on the right, No. 5 on the left of the caisson trail.

If the limbers are in rear of their carriages, the limbers move out together, inclining well to the left. The piece limber wheels to the right so as to move across in rear of the piece, the left wheel passing within about a foot of the lunette. When the axle of the limber is nearly in line with the trail, the gunner commands: 1. *Limber,* 2. ***HALT.*** The limber is then swung to the right, the wheels turning equally in opposite directions, is halted directly in front of the carriage and then backed slightly. The gunner and No. 1 raise the trail and place the lunette over the pintle; the gunner latches the pintle.

After moving far enough to the front, the caisson limber wheels to the right so as to move across in front of the caisson, the right wheel passing within about a foot of the lunette. It is halted at the command of No. 4 and swung to the left. The caisson is then limbered by Nos. 4 and 5 in a manner similar to that prescribed for the piece.

All the cannoneers take their posts at the carriages limbered.

If the limbers are posted on the flank, they approach the carriages in section column and separate as they reach the vicinity of the carriages, the piece limber passing along the rear, the caisson limber along the front of the position. Each limber proceeds to its own carriage and is limbered up in accordance with the foregoing principles.

If the carriages are not horsed, the limbers are drawn by cannoneers designated by the instructor. They move first the caisson and then the piece limber.

229. ***To the rear:*** 1. ***Limber,*** 2. ***REAR.***

The caisson is turned around 180°, the trail being carried away from the piece, the carriage turning on the left wheel; Nos. 4 and 5 work at the trail, Nos. 1 and 3 at the right and left wheels, respectively, the gunner and No. 2 in rear of the chest. As soon as the caisson is turned about, the trail is lowered to the ground; all the cannoneers then go to the piece, which is run straight to the rear and halted when it has cleared the caisson about 10 yards. The cannoneers then take their posts for limbering. The limbers, if in rear of the carriages, do not move out until the piece has been halted; they then take their positions and are limbered as prescribed in the preceding paragraph. If posted on the flank, they separate as they approach the position, each limber going to its own carriage.

To Leave the Park.

230. At the conclusion of the instruction in the park the instructor causes the carriages to be properly cared for, forms the squad, marches it to the battery parade ground, and dismisses it.

231. In the instruction of several squads, the instructor causes the squads to be formed in front or rear of the carriages, faces them to the right or left, and commands: 1. ***Close,*** 2. ***MARCH.*** The leading squad stands fast, the others close on the leading squad. The squads are then marched to the battery parade ground and dismissed.

SECTION III.—*The service of the piece.*

General Provisions.

232. 1. The individual duties of the cannoneers in loading, laying, fuse setting, etc., are performed as prescribed in The Cannoneer.

2. In firing instruction, a target or aiming point is designated, the firing data announced, and the operations of setting sights and fuses, loading, pointing, and firing the piece are habitually performed just as in actual firing.

3. The instructor utilizes every means at his disposal to simulate as nearly as possible the conditions which obtain when service ammunition is used.

4. If time admits, it is always advisable to dig a semicircular trench for the trail spade, as soon as the position has been occupied. Great facility in changing targets, and especially in firing at moving targets, is thus gained.

5. As much of the firing data as practicable may be communicated and set off on the instruments before occupying a position or making ready to fire.

In all cases instruments are set and the operations of setting fuses, laying, and loading are performed as rapidly as possible after the necessary firing data have been announced.

The announcement of the range as a command is the indication that all the data have been announced, and is the signal for loading. In fire at will, the command *fire at will* is the signal for loading.

The instructor in all cases gives the command or signal for firing, or for commencing the fire.

Methods of Laying.

233. There are two methods: *Direct* and *Indirect.*

234. *Direct laying* consists in bringing the line of sight upon the part of the target which the fire of the gun is intended to reach. In this case the gunner lays the gun for direction by means of the deflection scale of the panoramic or peep sight, and for range by means of the range scale. This method is used habitually when the gunner can clearly see through the sight the part of the target assigned to his gun. When direct laying is to be employed, the target is announced in the command, thus: *Target, that blockhouse.*

235. *Indirect laying* consists in taking some well-marked aiming point, generally outside of the target, and setting off a deflection such that when the line of sight is brought upon the aiming point the gun will be properly directed upon the target. In this case the gunner lays for direction only, and No. 1 lays for range by means of the quadrant.

This method of laying is the rule in all cases when the gunner can not clearly see through the sights the part of the target which the fire of his gun is intended to reach. As quadrant elevation is used, the angle of site of the target must be measured and set off on the quadrant.

When indirect laying is to be employed, the aiming point, and not the target, is announced in the command, thus: ***Aiming point, that white church steeple.***

To Load and Lay.

236. ***Direct laying:*** The piece being unlimbered and prepared for action, the cannoneers at their posts, the instructor commands, for example:

(Time fire.)	(Percussion fire.)
1. ***Target, that column of infantry.***	1. ***Target, that stone house.***
2. ***Deflection 5.***	2. ***Deflection, 6395.***
3. ***Corrector, 28.***	3. ***Shell.***
4. ***RANGE, 2600.***	4. ***RANGE, 2200.***

The cannoneers proceed to the performance of their respective duties as soon as the necessary data have been announced.

The ***gunner:*** 1. Lays for range and direction as prescribed in paragraph 150. If the piece has to be moved through a large angle to bring it on the target, he commands: 1. ***Trail,*** 2. ***RIGHT*** (***LEFT***), (par. 244).
  2. Calls ***ready*** as soon as the piece is loaded and laid.

No. 1: 1. Sets the brake as soon as the piece has been given the general direction.
  2. Opens the breechblock, closing it as soon as No. 2 has inserted the round.
  3. Grasps the firing handle with the left hand when the gunner calls ***ready.***

No. 2: 1. Springs to the end of the trail and gives the piece the general direction.
  2. Receives a round from No. 4 and inserts it smartly in the chamber.

No. 3: 1. Keeps the fuse-setter scales set at the range and corrector ordered.

No. 4: 1. Receives a round from No. 5; in the case of percussion fire, passes it at once to No. 2; in the case of time fire, sets the fuse before passing it.

No. 5: 1. Takes a round from the chest and passes it to No. 4.

237. *Indirect laying:* The piece being unlimbered and prepared for action, the cannoneers at their posts, the instructor commands, for example:

(Time fire.)	(Percussion fire.)
1. *Aiming point, that clock tower.*	1. *Aiming point, that windmill.*
2. *Deflection, 2630.*	2. *Deflection, 715.*
3. *Angle of site, 325.*	3. *Angle of site, 290.*
4. *Corrector, 28.*	4. *Percussion shrapnel.*
5. ***RANGE, 2900.***	5. ***RANGE, 3750.***

The cannoneers proceed at once to the performance of their respective duties as soon as the necessary data have been announced.

The *gunner:* 1. Lays for direction only, as prescribed in paragraph 152. If the piece has to be moved through a large angle to bring it on the target he commands: 1. *Trail,* 2. ***RIGHT*** (***LEFT***), (par. 244).

If the aiming point is in rear, the chief of section goes in front of the piece and causes No. 2 to move the trail so as to direct the rotating head of the panoramic sight on the aiming point. The gunner then lays accurately in direction.

2. Calls *ready* as soon as the piece is loaded and laid. (The fact that the piece is laid for range is indicated to him by No. 1 calling *set.*)

No. 1: 1. Sets the brake as soon as the piece has been given the general direction.

2. Opens the breechblock, closing it as soon as No. 2 has inserted the round.

3. Lays the piece for range as prescribed in paragraph 163.

4. Calls *set* as soon as the piece is correctly laid for range.

5. Grasps the firing handle with the left hand when the gunner calls *ready.*

The duties of Nos. 2, 3, 4, and 5 are as prescribed in the preceding paragraph.

238. It is most important that the gun squad should be drilled persistently and under all possible conditions in their combined duties in the service of the piece, the elements of which are set forth in the two preceding paragraphs. The several duties to be performed are there outlined; the readiest and most effective way of combining them, so as to insure mutual cooperation, is attained by practice and experience.

To Fire the Piece.

239. The piece being loaded and laid, the instructor commands: 1. *No. 1 (*or *such number),* 2. *FIRE.*

No. 1 fires the piece prescribed in paragraph 167.

As soon as the piece is fired, No. 1 opens the breechblock so as to eject the cartridge case; No. 2 receives the cartridge case or drill cartridge and passes it to No. 4 or No. 5, to be put in the chest. In rapid fire, the cartridge cases may be allowed to fall to the ground, and are collected and stored afterwards.

240. When using drill cartridges, No. 5 should be required to set the fuses at *safety* after firing and before returning them to the chest, or to No. 4 to be reset.

241. The gunner and No. 1 usually remain on the seats during the firing of the piece, steadying themselves by grasping the top of the shield or other convenient part of the carriage.

When the ground is particularly unfavorable for the engagement of the trail spade, the instructor may caution: *With the lanyard.* In this case, the gunner and No. 2 step clear of the wheels; No. 1 engages the hook of the lanyard in the eye of the firing handle, steps clear of the wheel and stands at attention, facing to the front, the end of the lanyard grasped in the left hand; at the command *fire,* he draws the lanyard toward him with a sharp jerk. The gunner and No. 1 then resume their seats and No. 2 resumes his post.

To Reload and Relay.

242. If the instructor desires to fire again at the same target, he makes such changes as may be necessary in the firing data by commands similar to those in paragraphs 236 and 237. He does not repeat data which he desires to remain unchanged from the previous fire, except that he always announces the range as a definite signal that loading is to be proceeded with.

For example:

(Direct laying, time fire.)	(Indirect laying, time fire.)
1. *Corrector, 33.*	1. *Deflection, 2650.*
2. *RANGE, 3300.*	2. *RANGE, 2900.*

The piece is loaded, laid, and made ready for firing as soon as the necessary data are announced.

To Change from Direct to Indirect Laying.

243. If on account of lack of visibility of the target or other causes it becomes desirable to pass from direct to indirect laying, the instructor commands, for example:

1. *Aiming point, that lone tree.*
2. *MEASURE THE DEFLECTION AND THE ANGLE OF SITE.*

The gunner measures and announces the deflection as explained in paragraph 154.

No. 1 measures and announces the angle of site as explained in paragraph 166, using the range at which the range scale of the sight is set.

The instructor then gives the necessary commands for loading and laying as explained in paragraph 237.

To Shift the Trail.

244. If it becomes necessary to move the trail to the right or left, either because the limit of traverse is reached or in order to fire at a target in a new direction, the instructor commands: 1. *Trail,* 2. *RIGHT* (*LEFT*).

The gunner repeats the command and traverses the piece until the azimuth pointer is at the middle of its scale. If following a target moving across the range, he traverses the muzzle of the gun as far as possible in the direction opposed to the movement of the target. For example, if the target is moving to the left, he traverses the muzzle as far as possible to the right. No. 1 releases the brake, No. 2 springs to the trail handspike, No. 1 to the right wheel, No. 3 to the left. Under the direction of the gunner, they turn the carriage until the line of sight comes approximately on the target or aiming point. As soon as the trail has been properly shifted, the gunners calls *Posts;* No. 1 sets the brake and all the cannoneers quickly resume their posts.

To Change Target.

245. To fire at a new target, the instructor commands: *CHANGE TARGET.* He at once points out the new target in direct laying, or announces the new deflection in indirect laying.

For example:

(Direct laying.)	(Indirect laying.)
CHANGE TARGET,	1. *Change target.*
THAT BATTERY.	2. *DEFLECTION, 2500.*

If the change of direction is such as to require it, the gunner commands: 1. *Trail,* 2. *RIGHT* (*LEFT*), and causes the piece to be prepared for firing in the new direction, as explained in the preceding paragraph. In indirect laying he at once sets off the new deflection, so that he may be able to direct the line of sight on the aiming point.

If the change of position is such as to make it necessary, and time admits, the caisson is then moved by Nos. 2, 3, 4, and 5 to its normal position by the side of the gun.

The instructor then announces the firing data, and the piece is loaded, laid, and fired as previously prescribed.

The gun squad should be frequently practiced in the important exercise of changing target.

To Discontinue and to Resume the Fire.

246. To suspend the fire, the instructor commands or signals: *CEASE FIRING.* The signal for *cease firing* is a long blast on the whistle; or, the arm raised and held vertical until the signal is obeyed.

The loading and firing are discontinued. No. 1 opens the breech. If a round is in the breech, No. 2 removes it and passes it to No. 4. The fuse is set at *safety* and the round returned to the chest. The cannoneers remain at ease.

247. To resume the fire, the instructor gives the necessary commands for resuming the interrupted method of fire, or for taking up a new one.

If it is not intended to resume the fire the instructor commands: 1. *Cease firing,* 2. *MARCH ORDER.*

If, on the other hand, it is intended to resume fire immediately, but in another position, so that the limbering of the carriages is necessitated, the command *march order* is not given. At the command for limbering, Nos. 4 and 5 close the caisson door and raise and secure the fuse-setter bracket. They raise the caisson door and lower the bracket again without command, upon reaching the new position for action.

If the ground to be traversed is very rough, or is covered with rocks or stumps of trees, the captain requires the aprons to be secured in the traveling position before commencing the movement. The panoramic sights and range quadrants should also be returned to their cases.

Special Methods of Fire.

248. The methods of fire usually employed to produce effect upon a target are: ***Continuous fire*** and ***Volley fire***. Each of these may be used with or without sweeping. ***Fire at will*** is a special method of fire adapted to the close defense of the gun. It is without sweeping.

249. *Sweeping* is employed only with time shrapnel and during fire for effect. Its purpose is to distribute the fire over a wide front. It consists in changing the direction of the piece between shots by a full turn of the traversing handwheel.

The number of rounds fired in a sweep is specified in the command (par. 320). The first round is fired with the piece directed upon the right portion of its target, and the other rounds are fired after traversing the piece to the left by a turn of the handwheel. The number of turns is thus always one less than the number of rounds fired.

The execution of sweeping is explained below under the several methods of fire.

CONTINUOUS FIRE.

250. In continuous fire, rounds are fired at regular intervals until cessation of the fire is ordered.

The firing data are determined by a previous fire for adjustment, and the same data are used for all the rounds, unless the instructor, during the progress of the fire, announces new data.

If, during the progress of the fire, the instructor announces a change in the data, the change is effected for the next round after the announcement is made and without interrupting the continuity of the fire.

251. ***Without sweeping:*** The target or aiming point being well understood and the firing data established, the instructor commands, for example:

1. ***Continuous fire.***
2. ***RANGE, 2950.***

The piece is loaded, laid and made ready for firing continuously with the same data, the instructor giving the command for firing in each case. He gives the command so that there will be the desired interval between shots. When he desires the fire to cease he commands: ***Cease firing.***

252. ***With sweeping:*** The target or aiming point being well understood, and the firing data established, the instructor commands, for example:

1. ***Continuous fire.***
2. ***Three rounds, sweeping.***
3. ***RANGE, 3125.***

Executed as in paragraph 251, with the following modifications: The first round is fired with the line of sight directed on the right portion of the target or on the aiming point. Before firing each of the succeeding rounds of the sweep, the gunner traverses the piece to the left by a full turn of the traversing handwheel, and for these rounds disregards accurate laying in direction.

As soon as the last round of the sweep has been fired the gunner traverses the piece back to the right until the line of sight is again on the right portion of the target or on the aiming point, and commences a new sweep. The fire is thus continued until ***cease firing*** is ordered. The command for firing is in each case given by the instructor.

VOLLEY FIRE.

253. In volley fire each piece fires a designated number of rounds as rapidly as is consistent with accurate laying and orderly service of the piece.

The firing data are determined by a previous fire for adjustment; the same data are used for all the rounds of the volley.

254. ***Without sweeping:*** The target or aiming point being well understood, and the firing data established, the instructor commands, for example:

1. ***Volley fire.***
2. ***Three rounds.***
3. ***RANGE, 2800.***

The piece is at once loaded and laid for the first round, as prescribed in paragraph 236 or paragraph 237, but the firing does not commence until the instructor commands: ***Commence firing.*** At this command the gunner commands: 1. ***Ready,*** 2. ***FIRE.*** At the second command No. 1 fires the piece. The operations of setting fuses, loading, laying and firing are then carried on continuously until the specified number of rounds has been fired, the command for firing being given by the gunner as soon as the piece is loaded and laid.

To avoid mistakes, No. 4, as he passes each round to No. 2, calls out the range and the number of the round in the volley, thus:

2800______________________________________One.
2800______________________________________Two.
2800______________________________________Three.

255. ***With sweeping:*** The target or aiming point being well understood, and the firing data established, the instructor commands, for example:

1. ***Volley fire.***
2. ***Two rounds, sweeping.***
3. ***RANGE, 1800.***

Executed as explained for a volley without sweeping, with the following modification: The first round of the volley is fired with the line of sight directed on the right portion of the target or on the aiming point. Before firing each of the succeeding rounds of the volley the gunner traverses the piece to the left by a full turn of the traversing handwheel, and for these rounds disregards accurate laying in direction.

As soon as the last round of the volley has been fired the gunner traverses the piece back to the right until the line of sight is again on the right portion of the target or on the aiming point.

256. The examples given above of commands appropriate in the cases of volley fire are on the assumption that the firing data have been completely established by previous fire and that the instruments are all set at the readings last used. If this is not the case, or if it is desired to make changes in the data last used, then the necessary data are announced in the command (Par. 279).

Fire at Will.

257. This method of fire is used for the close defense of the guns. Time fire is the rule, the fuses being set at zero. If possible to foresee the necessity, a number of fuses are set at zero in anticipation of their use. Direct laying is employed.

258. The instructor commands, for example:

1. ***Approaching cavalry.***
2. ***FIRE AT WILL.***

The gunner sets the sight at 1,000 yards; No. 3 sets the fuse setter scales at zero range and corrector 30; the piece is promptly loaded and laid. At the instructor's command: ***Commence firing,*** the gunner commands: 1. ***Ready,*** 2. ***FIRE;*** at the second command, No. 1 fires the piece. The operations of setting fuses, loading, laying, and firing are then carried on continuously, the command for firing being given by the gunner as soon as the piece is loaded and laid. The firing is continued until the instructor commands: ***Cease firing,*** or until the target disappears from view or actually reaches the gun. In the latter event the cannoneers shelter themselves behind the carriages and defend themselves with the pistol.

259. With fuses set at zero, an elevation of the piece corresponding to a range of about 1,000 yards gives the most favorable distribution of the shrapnel bullets, and, with fuses thus set, accurate laying is not essential; it is sufficient to keep the gun pointed roughly at the target by the use of the peep sight. Such fire is effective up to about 350 yards from the gun.

Moving Targets.

260. Direct laying is the rule. The instructor commands, for example:

1. ***Moving target, that squadron of cavalry.***
2. ***Deflection, 10.***
3. ***Corrector, 27.***
4. ***RANGE, 2400.***

The gunner causes No. 2 to direct the piece upon the head of the target, or, if the target is moving across the plane of fire, then somewhat in front of it; in the latter case the gunner first traverses the muzzle as far as possible in the direction opposed to the movement of the target.

The piece is loaded and laid as prescribed in paragraph 236. As soon as the line of sight is brought on the target the gunner commands *ready,* but continues to keep his gun laid on the target until the command for firing is given by the instructor.

As soon as the piece has been fired the gunner resumes following the target. When the limit of traverse is reached, he commands: 1. *Trail,* 2. *RIGHT* (*LEFT*), causes the piece to be directed ahead of the target, and traverses the muzzle to the opposite limit of traverse.

The instructor causes other single rounds to be fired by announcing such changes in the data as may be necessary and by giving the command for firing.

261. To employ volley fire the instructor commands, for example:

1. *Volley fire.*
2. *Five rounds.*
3. *RANGE, 2500.*

At the instructor's command, *commence firing,* the fire is executed as described in paragraph 254, the gunner keeping the line of sight directed upon the target, and the operations of loading, laying, and firing being carried on continuously and rapidly until the required number of rounds has been fired.

262. In the attack of large moving targets, indirect laying may be employed. The procedure is then only a special application of *changing targets* (par. 245). The B. C. telescope is used. It is sighted on the aiming point at zero deflection, and the lower limb of the instrument clamped; the upper limb is then swung around upon the target, or, if the target is moving across the range, the telescope is directed at a sufficient angular distance ahead of the target to allow time for loading and laying the piece. The piece is sighted on the aiming point with the deflection at which the telescope is set, corrected for the distance from telescope to gun and for the movement of the target; just before the target appears on the vertical cross hair in the field of view of the telescope, the command for firing or for commencing the fire is given by the instructor.

The telescope is then set ahead in deflection by an amount depending upon the rate of travel of the target, and the piece is laid and fired as before.

263. The travel of the target during the time of flight involves variations in range and deflection. Corrections for range due to time of flight are unnecessary. Corrections for deflection made according to the following rule will be found sufficiently exact:

RULE.—If the line of travel of the target makes an angle greater than 45° with the line of fire take 5 mils deflection, if the target is moving at a walk; 10 mils, if moving at a trot; 15 mils, if moving at a gallop. If this angle is less than 45° and greater than 15°, take one-half of the foregoing deflections. For angles less than 15° make no correction.

If the target is moving to the left, add the correction; if to the right, subtract it.

264. As targets will ordinarily remain exposed to view in the open but a short period of time, great skill in serving the piece and a high order of fire discipline are required to attain quickly an effective fire upon such targets. The squad is accordingly frequently practiced in simulated fire at targets moving at various angles to the plane of fire and at different rates of speed. Mounted detachments, the caissons of a battery, or any vehicles which happen to appear on the terrain may be utilized for targets. The squad is practiced in getting the gun quickly directed upon a suddenly appearing target, in following its movements, and in keeping up a continuous fire, the instructor prescribing the method of fire and announcing such changes in the firing data as may from time to time be necessitated by the movements of the target.

Service of the Piece with Reduced Numbers.

265. In order to accustom the squad to maintaining the service of the piece when its strength is reduced by casualties in action, the instructor causes certain cannoneers to fall out and assigns their duties to the cannoneers who are retained, as follows:

Cannoneers retained.	Distribution of duties.				
	G	1	2	3	4
G, 1, 2, 3, 4	G	1	2	3	4, 5
G, 1, 2, 3	G	1	2	3, 4, 5	
G, 1, 2	G	1	2, 3, 4, 5		
G, 1	G, 1	2, 3, 4, 5			

CHAPTER IV.—THE FIRING BATTERY.

SECTION I.—*General provisions.*

266. 1. ***The firing battery*** comprises the guns and caissons of the first five sections of the battery, with the personnel and animals assigned to their immediate service. It is under the direct command of the captain.

The instruction of the firing battery is carried on both in the battery park and during mounted exercises over all forms of terrain available. In this instruction the captain is assisted by such officers, noncommissioned officers, and men as he may assign for the purpose.

2. The formations, dispositions, exercises, and duties in the service of the piece prescribed for a single squad apply, with obvious modifications, to the firing battery.

3. The guns and caissons are unlimbered and placed in line, the carriages of each section being arranged as prescribed in paragraph 217. The interval between the wheels of adjacent pieces is 17 yards. If the caissons of the fifth section are present, one is unlimbered on each flank of the battery either on the line of the guns at 17 yards interval from the nearest piece, or in rear of the line under cover, as the captain may direct. The limbers are posted as prescribed in paragraphs 218 and 219.

4. For instruction of the firing battery in the park, the battery is marched to the park and there formed into gun squads.

SECTION II.—*Duties in general of officers and noncommissioned officers.*

267. ***Captain:***

Commands the battery, and, as a rule, conducts the fire.

Senior lieutenants:

1. Command platoons.
2. Supervise the service of their guns.
3. Make sure that the guns are laid on the proper target.
4. Distribute the fire in direct laying, by assigning to each gunner his special part of the target.
5. Make minor changes in deflection so as to bring the points of burst on the target, in direct laying; to their proper relative place in the sheaf, in indirect laying (par. 286).

Reconnaissance officer:

1. Determines firing data.
2. Supervises the work of scouts and auxiliary observing parties.
3. Assists the battery commander in watching the battlefield and noting changes in the tactical situation.
4. Attends to the maintenance of communication.

Junior lieutenant:

1. Commands the combat train.

First sergeant:

1. Assists the captain.
2. Posts the limbers when they take position under cover.
3. Keeps the captain informed as to ammunition supply, takes charge of the removal and replacement of empty caissons.
4. Has general charge of the replacement of casualties.

Sergeants:

1. Command sections.
2. Supervise the service of their guns, watching carefully that sights, quadrants, and fuses are properly set.
3. Chief of fifth section ordinarily has charge of battery commander's telescope; sets it up and assists in using it.

Gunners:

Perform the duties prescribed in The Cannoneer and The Gun Squad.

Caisson corporals:

1. Act as relief for gunners;
2. Perform the various duties assigned them as scouts, etc.

Posts: The specific posts of the various officers and noncommissioned officers are as prescribed in The Battery Mounted (par. 663). During the instruction they post themselves where they can best perform the duties assigned them. In action they post themselves so as to obtain shelter and concealment without interfering with the performance of their duties.

SECTION III.—*Methods of obtaining distribution of fire.*

Individual Distribution.

268. ***Individual distribution*** is obtained by assigning to each gunner a definite part of the target to attack. Direct laying is always employed.

If the target has clear and well-defined limits, then each chief of platoon, without special indication from the captain, assigns to each of his guns that portion of the target corresponding to its relative position in the battery. He indicates clearly to the gunner the part of the target on which he is to lay.

If the target has ill-defined limits, the captain first explains to the chiefs of platoon the exact front which the battery is to attack.

Collective Distribution.

269. *Collective distribution* is obtained by assigning a common aiming point to the pieces and giving them deflections which vary from right to left in regular progression. The fire may thus be distributed to any degree desired by the captain. Indirect laying is always employed.

The right piece is given a deflection such that when its line of sight is directed upon the aiming point the piece will be directed on the right section of the target. This deflection is increased (or diminished) for each of the other pieces by a correction which, applied in arithmetical progression, will cause the fire to be evenly distributed over the front of the target assigned to the battery.

This correction is called the *deflection difference.* Its determination is explained in paragraphs 419–426.

270. When a common aiming point is used, the right piece is habitually taken as the directing piece. Methods of determining the deflection necessary to direct the fire of this piece upon the right section of the target are explained in paragraphs 427–433.

271. The lines of fire of the several pieces thus collectively directed are called the sheaf of fire. By announcing the deflection of the right piece and the deflection difference, the initial data for forming the sheaf are furnished. If no deflection difference is announced, all the pieces take the deflection which is announced.

Example: The deflection of the right piece is determined as 2980, and the deflection difference as *plus* 10.

The captain commands: 1. *Deflection 2980;* 2. *Increase by 10.*

The right piece (No. 1) is given deflection 2980.

The right center piece (No. 2) is given deflection 2990.

The left center piece (No. 3) is given deflection 3000.

The left piece (No. 4) is given deflection 3010.

The line of sight of each piece is then brought on the common aiming point.

272. To open or close the sheaf; the officer conducting the fire may command, for example: ***Increase by 2;*** or, ***Diminish by 3,*** in which case the amount of increase or decrease of deflection is applied in arithmetical progression to the deflections already set off, in the same manner in which the deflection difference is applied to the deflection of the right piece in the initial formation of the sheaf.

Example: The sheaf having been formed as in paragraph 271, the captain decides to open the sheaf 6 mils, and commands, ***Increase by 2:***

	Initial sheaf.	New sheaf.
No. 1	2980	2980
No. 2	2990	2992
No. 3	3000	3004
No. 4	3010	3016

Or, he may command, for example: ***Fourth piece, add 10; First piece, subtract 5,*** etc.

Example: The captain desires to open out the sheaf quickly from the center.

He commands: ***First piece, subtract 10; Second piece, subtract 5; Fourth piece, add 5.***

The deflections set off are:

	Initial sheaf.	New sheaf.
No. 1	2980	2970
No. 2	2990	2985
No. 3	3000	3000
No. 4	3010	3015

273. To shift the entire sheaf without changing the deflection difference; he may command, for example: ***Add 40;*** or, ***Subtract 15,*** in which case each piece increases or diminishes its deflection by the amount stated. Or, he may announce a new deflection and the old deflection difference. (Par. 245.)

Example: The captain desires to shift the sheaf upon a target 100 mils to the left of the target considered in the last example and to keep the same distribution.

He commands: *Add 100.*

The deflections set off are:

No. 1	3070
No. 2	3085
No. 3	3100
No. 4	3115

274. To shift the entire sheaf and at the same time change the deflection difference; he announces a new deflection and a new deflection difference.

Example: The captain desires to shift the sheaf 110 mils to the right and to close the sheaf.

He commands: 1. *Deflection 2960;* 2. *Increase by 8.*

The deflections set off are:

No. 1	2960
No. 2	2968
No. 3	2976
No. 4	2984

275. If a deflection for the right piece and a deflection difference are announced, the deflection difference is applied to the announced deflection.

SECTION IV.—*Communication of firing data to the guns.*

276. The firing data comprise:

(For direct laying.)	(For indirect laying.)
1. The deflection.	1. The deflection of the right piece.
2. The corrector.	2. The deflection difference.
3. The range.	3. The angle of site.
	4. The corrector.
	5. The range.

277. In addition to the firing data, there must be communicated to the guns:

1. The target. or aiming point.
2. The method of laying.
3. The method of fire.
4. The projectile to be used.

278. The foregoing information will habitually be communicated in the following order:

1. ***Indication of target or aiming point, and method of laying.*** Thus: "Target, that battery" (direct laying), or "Aiming point, that steeple" (indirect laying).

2. ***Method of fire.*** Thus: "By battery from the right" or "Volley fire."

3. ***Deflection, and deflection difference:*** Thus: "Deflection, 5," or "Deflection, 3390, diminish by 5."

4. ***Angle of site:*** Thus: "Angle of site, 315."

5. ***Kind of projectile:*** Thus: "Corrector 25" (indicating time shrapnel) or "Percussion shrapnel" or "Shell."

6. ***Range:*** Thus: "Range, 3000."

279. Before the commencement of the fire, the foregoing information, or such of it as is necessary in the particular case, must be communicated to the guns. But during the progress of the fire those elements which are to remain unchanged are not repeated from command to command, except that in all methods of fire, except ***fire at will,*** the range is always announced as the indication that all changes in the data have been made and that the guns should be loaded.

280. The firing data and other information may be—

1. Announced as a command.
2. Communicated to the assembled gunners.

281. ***First:*** When announced in the command, the chiefs of platoon announce the deflection for each of their pieces as soon as the captain has announced the deflection and the deflection difference.

The captain announces, for example:

Deflection, 4730;
Increase by 5.

The chief of the platoon on the right announces:

Deflection No. 1, 4730;
No. 2, 4735; and

The chief of the platoon on the left announces:

Deflection No. 3, 4740;
No. 4, 4745.

The other elements of the firing data are repeated by the chiefs of platoon, item by item, as they are announced by the captain.

If the target or aiming point can not be clearly designated in the command, the captain directs: ***Chiefs of platoon report.*** They hasten to the captain, receive the necessary information, return to their platoons, and, calling their gunners to them point out the aiming point or that part of the target at which each gun is to be fired.

282. ***Second:*** When the situation admits, the captain directs: ***Report for firing data.*** The chiefs of platoon and of section and the gunners—the latter carrying their panoramic sights—hasten to the captain and form in line facing him in the order of the pieces from right to left, the gunners on the right and left of their chiefs of platoon, the chiefs of section in rear of their gunners. The captain points out the target or aiming point, designates the method of fire, the method of distribution, and the projectile to be used, and gives such other instructions as he may desire.

In the case of collective distribution he announces the deflection of the right piece and the deflection difference. The gunners call off at once, in order from right to left, the deflections pertaining to their respective pieces, and immediately set their sights accordingly.

The captain commands, for example:

Deflection, 2630;
Diminish by 10.

The gunner of the right piece announces and sets 2630.

The gunner of the right center piece announces and sets 2620.

The gunner of the left center piece announces and sets 2610.

The gunner of the left piece announces and sets 2600.

At the captain's command ***posts,*** the chiefs of platoon and of section and the gunners return to their posts; the instruments are set, and the pieces laid as far as practicable with the information furnished.

The captain may also direct that the pieces be loaded.

283. The captain always gives the command or signal for firing or commencing the fire. If given by word of mouth, the command is: ***Commence firing.***

The signal for firing or commencing the fire is made as follows: Raise the hand to the height of the forehead; then make an energetic gesture of the hand upward and outward, fully extending the arm, and quickly drop the hand to the side.

The captain gives the command or signal so that the fire will commence at the desired moment. He may give it immediately after announcing the necessary firing data, or after an interval, if the circumstances so require.

The captain having given the command or signal for firing, the command of execution, except in the case of salutes, is then given by the chief of section or the gunner, as the case may be.

The chief of section gives the command of execution in *continuous fire* and in all cases of fire *by battery, by platoon*, or *by piece*. Thus: 1. ***No. 1*** (or *such number*); 2. ***FIRE***.

The gunner gives the command of execution for firing in *volley fire* and *fire at will*. Thus: 1. ***Ready***; 2. ***FIRE***.

In those cases in which the gunner gives the command of execution, the chief of section, at the captain's command or signal *commence firing*, cautions *commence firing*.

In the case of salutes the captain gives the command of execution. Thus: 1. ***No. 1*** (or *such number*); 2. ***FIRE***.

SECTION V.—*Fire for adjustment and fire for effect.*

284. *Fire for adjustment* has for its principal object the determination or verification of the firing data.

Fire for effect has for its object the destruction or the neutralization of the target.

Fire for Adjustment.

285. The captain adapts his method of adjustment to the circumstances of the particular case with which he has to deal. The nature of the target, the facilities for observation of fire, the possibility of producing great effect by a rapid method of fire, and the husbanding of ammunition, are all considerations which enter into the matter.

Either time or percussion fire may be employed. That kind is generally used which is to be used in the subsequent fire for effect. But, due to accidents of the ground, etc., adjustment with time fire, using low bursts, is frequently advantageous, even though percussion fire is to be used in the fire for effect.

If *sweeping* is to be employed in the subsequent fire for effect, the adjustment is secured without sweeping, each piece being directed upon the right portions of its target. If observation of fire will be assisted, however, the fire may be converged until the adjustment in range is secured, and then diverged to adjust the distribution.

The following are the methods of fire usually employed in adjustment:

1. *By battery salvo.*
2. *By platoon salvo.*

286. *By battery salvo:*

The captain commands, for example:

(Direct laying.)	(Indirect laying.)
1. *Target, that line of infantry.*	1. *Aiming point, that stone monument.*
2. *By battery from the right.*	2. *By battery from the left.*
3. *Deflection, 10.*	3. *Deflection, 3650.*
4. *Corrector, 28.*	4. *Diminish by 15.*
5. *RANGE, 3000.*	5. *Angle of site, 310.*
	6. *Corrector, 27.*
	7. *RANGE, 3300.*

The pieces are loaded and laid as prescribed in paragraph 236 or paragraph 237.

As each gunner commands *ready*, his chief of section faces the captain and raises the right hand.

When the captain sees that all the pieces are ready, he commands or signals: *Commence firing.*

The chief of section on the indicated flank commands: 1. *No. 1* (*No. 4*); 2. *FIRE.*

The pieces are fired in turn from the flank indicated by command of their chiefs of section, the intervals between the shots being about three seconds.

The captain observes the group of bursts and estimates quickly the corrections necessary. He makes the necessary corrections in range and height of burst. In indirect laying, he also modifies the direction of the sheaf and the deflection difference, so as to cause the fire to be directed and properly distributed upon the target.

The chiefs of platoon, in direct laying, make the minor changes in deflection necessary to bring the line of fire of each of their guns upon its target, and in indirect laying, to bring the line of fire of each gun to its relative place in the sheaf. If the chiefs of platoon can not see the burst of shots, the captain makes the corrections in deflection.

287. For succeeding salvos, the captain commands, for example:

(Direct laying.)	(Indirect laying.)
1. *Corrector, 23.*	*Subtract 20.*
2. *RANGE, 3000.*	*RANGE, 3700.*

Or, he makes such other corrections as may be necessary. The pieces are loaded, laid, and fired as before.

288. When the fire for adjustment is to be by platoon, the captain designates beforehand the platoon to be used for this purpose. Thus: *Right platoon the adjusting platoon.* In the case of indirect laying, the right platoon is usually designated. The pieces which do not take part in the fire for adjustment are kept laid with the firing data last announced, and all preparations are made by them to take up the fire as soon as the adjustment is completed. Before passing to fire for effect a *verifying salvo* is usually fired by all the pieces which are to take part in the fire for effect.

If a verifying salvo by all the guns has not been fired, or if the caution *All the guns* is not given, then only those guns participate in the fire for effect which have been used in securing the adjustment.

289. *By platoon salvo:*

The captain commands, for example:

(Direct laying.)	(Indirect laying.)
1. *Target, that machine gun.*	1. *Aiming point, that smokestack.*
2. *By platoon from the left.*	2. *By platoon from the right.*
3. *Deflection, 6395.*	3. *Deflection, 4860.*
4. *Corrector, 28.*	4. *Increase by 5.*
5. *RANGE, 2500.*	5. *Angle of site, 290.*
	6. *Corrector, 28.*
	7. *RANGE, 3700.*

The pieces of the designated platoon are loaded and laid. As each gunner commands *ready,* his chief of section faces the captain and raises the right hand. When the captain sees that both pieces are ready, he commands or signals: *Commence firing.* The pieces of the designated platoon are then fired in turn from the indicated flank, as explained in paragraph 286.

The captain observes the burst of the shots and announces such changes in the firing data as may be requisite for the succeeding fire.

290. Salvos *by battalion* or *by regiment* may be fired by commands and means similar to those prescribed in paragraph 286. Such salvos are exceptional and it should seldom be necessary to use this method.

FIRE FOR EFFECT.

291. The firing data having been verified to the extent required by the circumstances, the captain passes to *fire for effect.*

He employs the method of fire best adapted to the circumstances of the case with which he has to deal.

The usual methods of fire for effect are:

1. *Continuous fire.*
2. *Volley fire.*

An exceptional method is:

3. *Fire at will.*

Continuous fire:

292. In continuous fire the pieces are fired in regular order from one flank of the battery to the other, at such intervals of time as the captain may designate, and the fire is kept up until he orders its cessation. If the order of fire has been established by previous fire, the same order is maintained. If it has not been thus established, the fire is from right to left, unless the captain cautions *from the left.*

293. To fire *without sweeping,* the captain commands, for example:

1. *Continuous fire.*
2. *Interval, 15 seconds.*
3. *RANGE, 2700.*

Each chief of section faces his chief of platoon when his piece is ready, and at the latter's signal gives the command for firing. The chiefs of platoon cause the pieces to be fired in the appropriate order at the interval given in the command. As soon as fired each piece is at once loaded, laid, and made ready for the next round.

The captain observes the fire and makes such changes in the firing data as may from time to time be necessary.

294. To fire *with sweeping,* the captain commands, for example:

1. *Continuous fire.*
2. *Three rounds, sweeping.*
3. *Interval, 20 seconds.*
4. *RANGE, 4250.*

Executed as in paragraph 293, except that between the successive shots of each piece its direction is shifted as explained in paragraph 252.

295. *Volley fire.*

A *volley* or a *volley sweeping,* consists in the discharge by each piece of a designated number of rounds, fired as explained in paragraphs 254 and 255.

296. To fire a volley *without sweeping,* the captain commands, for example:

1. *Volley fire.*
2. *Three rounds.*
3. *RANGE, 3100.*

The pieces are at once loaded and laid for the first round. Each chief of section, as soon as he has satisfied himself that any changes ordered in the firing data have been made, looks toward the captain and at the latter's command or signal *commence firing,* cautions: *Commence firing.* Each gunner then proceeds to fire the number of rounds specified in the command, as explained in paragraph 254.

297. To fire a volley *with sweeping,* the captain commands, for example:

1. *Volley fire.*
2. *Three rounds, sweeping.*
3. *RANGE, 3500.*

The pieces are at once loaded and laid for the first round. At the captain's command or signal *commence firing,* the chiefs of section caution: *Commence firing,* and each gunner fires three rounds sweeping, as explained in paragraph 255.

298. If the captain desires to make changes in the firing data from volley to volley, he announces the new data in the commands.

299. If the target has little depth and its range has been accurately determined, several volleys may be fired at this range; the fire is then said to be *by volleys at a single range.*

If, however, the target has considerable depth, or if the range has not been accurately determined, the area within which the target has been located may be searched by progressively increasing or diminishing the range from volley to volley; the fire is then said to be *by volleys at successive ranges.* The range difference between volleys is determined by the captain according to the circumstances of the case; for example, range, density of fire which it is desired to obtain, etc.

300. ***Fire at will.***

When this method of fire is ordered, each piece executes a rapid individual fire, as explained in paragraph 258. Each piece is laid on the part of the target opposed to it.

The captain commands, for example:

1. ***Approaching infantry.***
2. ***FIRE AT WILL.***

The chiefs of section look toward the captain, and at his command or signal ***commence firing,*** they caution: ***Commence firing.*** The gunners then proceed with rapid individual fire, as explained in paragraph 258.

Chiefs of platoon and section are careful to see that fuse setters are set at corrector 30 and zero range.

Moving Targets.

301. The pieces may be directed upon a zone which it is evident the target will have to cross and upon which the fire has been previously adjusted. In this case they are made ready for firing by volleys, the fire being opened at the captain's command or signal ***commence firing*** as the target draws near to the selected zone.

302. To adjust the fire upon a target in motion, salvos or volleys are used, depending upon the nature of the target and the speed and direction of its movement. For large, slowly moving targets salvos may be used. For targets moving rapidly volleys are desirable.

The fire for effect is by volley fire.

SECTION VI.—*Change of target.*

303. A change of target is executed by the battery as explained for a single piece in paragraph 245, the new firing data being communicated as in paragraph 280.

The chiefs of platoon see that the pieces are quickly directed upon the new target. If the new target is at such an angular distance from the old as to make firing from the old line dangerous, the pieces are moved by hand under direction of the chiefs of platoon so as to establish a line normal to the new direction. This movement is generally pivoted on one of the center pieces. As soon as their pieces are directed on the new target, the chiefs of platoon report: ***(Such) platoon on the target.***

304. If circumstances require it, the captain may command, for example: 1. ***No. 1*** (or ***such number),*** or 1. ***Right*** (or ***such platoon),*** 2. ***CHANGE TARGET.***

In this case only the indicated piece or platoon changes its direction.

SECTION VII.—*Replacement of ammunition.*

305. The ammunition chests of the firing battery should, if practicable, always be filled before occupying a position.

If a position is prepared for occupation for a considerable time, spare rounds may be brought up from the limbers or the combat train and stored at suitable places near the guns.

The caissons of the gun sections are ordinarily refilled, during lulls in the action, from the caissons of the fifth section, which are placed on either flank of the battery. When empty these caissons are withdrawn and replaced by caissons from the combat train. If necessity requires, the caissons of the gun sections may be replaced directly by caissons from the combat train.

The caissons of the gun sections may also be refilled from the limbers of the firing battery. The latter are refilled from the caissons of the combat train at the first opportunity.

Empty caissons of the combat train are filled without delay from the ammunition train.

Movements of the carriages are habitually made under cover, if possible, and during lulls in the action.

306. ***Replacement from caissons of the fifth section:*** The captain commands: ***Draw ammunition from the fifth section.*** The chiefs of section and cannoneers of each platoon hasten to the caisson which is on the flank of their platoon. The gunner remains with the caisson of his section. The chiefs of the right and left sections in each platoon place themselves in rear of the right and left sides, respectively, of a flank caisson; their cannoneers form in single file behind them and receive from them in turn two rounds each, which they take to their sections and turn over to the gunner. The gunner puts the rounds in the chest.

Cannoneers present with the fifth section caissons assist in carrying the ammunition, under direction of the nearest chief of platoon. The chiefs of platoon supervise the replacement of ammunition and command: ***Posts,*** as soon as it is completed.

307. ***Replacement from the limbers:*** The captain, if necessary, first causes the limbers to be brought to a convenient position near the guns, and then commands: ***Draw ammunition from the limbers.*** The ammunition is drawn for each section from its own limbers, in a manner similar to that above described. The ammunition in the gun limbers is ordinarily maintained as a last reserve.

SECTION VIII.—*Replacement of casualties.*

308. Firing instruction is frequently practiced with reduced personnel, certain officers, noncommissioned officers, and men being directed to fall out as representing casualties in action. If the captain does not give special instructions as to the replacement of these individuals, the following obtains:

The captain is replaced by the senior lieutenant.

A platoon commander is replaced by his senior chief of section.

A chief of section is replaced by a sergeant from the reserve.

A gunner is replaced by a caisson corporal, or temporarily by his chief of section.

The cannoneers of a gun squad perform additional duties, as prescribed in paragraph 265, until cannoneers can be brought up from the reserve.

The first sergeant has general charge of the replacement of casualties among the enlisted men, and summons men from the limbers or the combat train when necessary.

In action, if casualties become excessive, the service of certain guns may be discontinued and the cannoneers sent to assist at others, so as to have at least a gunner and two men for each piece in action. But the piece may be loaded, laid and fired by one man, and the fire of the battery must not cease as long as there are men to serve any of its guns.

CHAPTER V.—PREPARATION AND CONDUCT OF FIRE.

SECTION I.—*Preparation of fire.*

1. POSITIONS.

309. Positions are defined as ***masked*** or ***unmasked,*** according as they afford concealment or not.

When no concealment is afforded, the guns are said to be in an ***unmasked position,*** and the fire is referred to as ***unmasked fire.***

When concealment is afforded, the guns are said to be in a ***masked position,*** and the fire is referred to as ***masked fire.***

The degree of concealment varies. Thus:

(*a*) If the guns are posted so that through the sights the hostile position can just be seen over the mask, they are said to have ***sight defilade;***

(*b*) If they are posted where a dismounted man can just see the hostile position over the mask, they are said to have ***dismounted defilade;***

(*c*) If where a mounted man can just see the hostile position over the mask, to have ***mounted defilade;*** and

(*d*) If so that the flash of the gun will be concealed, to have ***flash defilade.***

310. The hostile position against which we defilade may be the target to be attacked; preferably, however, defilade is taken against the highest position which the enemy's observing parties can occupy.

311. Positions are described by the foregoing terms; thus a battery commander may be told to take a position for ***masked fire, flash defilade.***

312. A defilade of 4 yards is sufficient to conceal the flash of the gun by day. A defilade greater than this is still referred to, however, as ***flash defilade.***

If the position is on a reverse slope and the slope is fairly uniform, defilade of 4 yards may be quickly obtained as follows: Post a dismounted man and a mounted man covering each other, the first in the position of dismounted defilade, the second in that of mounted defilade; then post the guns in rear of the mounted man a distance slightly greater than the distance separating him from the dismounted man.

Complete concealment is obtained only in positions having flash defilade.

313. Artillery may be posted for ***immediate action, in observation,*** or ***in readiness.***

When posted for ***immediate action*** the guns are unlimbered and fire is opened as promptly as possible upon the indicated targets. The position may be masked or unmasked.

When posted ***in observation*** the guns are unlimbered and all preparations made for opening at the desired moment upon the existing or expected targets. The position is usually masked.

When posted *in readiness* the guns are not unlimbered. They are held under cover near a position for possible immediate action, but so that they can be moved quickly to another locality if the development of the tactical situation so requires. In the meantime the immediate tactical situation is studied, positions in the neighborhood for posting the guns to meet different eventualities are selected, and preparations are made for occupying the selected positions and for promptly opening fire upon the existing or expected targets.

2. *DUTIES OF OFFICERS.*

314. Due to the extensive use of cover brought about by the efficiency of modern firearms, the targets of artillery are apt to be concealed from view a great part of the time, and, when visible, to remain so but a short time. To find out where the enemy is and to secure the information which will enable the guns to open prompt and effective fire have hence become duties of the first importance. *Before the commencement of the action and through all its phases* this information must be sought. Preparation must be made on the tactical side for posting the guns where they will be most effective, and on the technical side for securing the data which will permit fire to be opened promptly on all the positions in which the enemy is known to be or which he is expected to occupy.

Duties devolving upon officers prior to and during an action are set forth in Part VI. Those duties which particularly affect the technical preparation of fire are especially emphasized here.

315. The higher artillery commanders are concerned especially—

1. To procure by all possible means definite information as to the position of the enemy, or as to the positions liable to be occupied by him.

2. To select positions for the different units of artillery and cause reconnaissance officers to determine the necessary firing data for these positions.

3. To assign each unit its particular duty or task, designating, when appropriate, those units for *immediate action* and those to take position *in observation* or *in readiness*.

4. To formulate clearly in their minds the terms or methods which they will employ in the designation of objectives (targets, aiming points, registration marks, etc.).

5. To provide each subordinate commander and to keep him provided with all available information, technical and tactical which will assist him in the performance of his duties.

For this purpose to organize the service of information and communication so that information as to positions and movements of the enemy and of our own troops may, on the one hand, be quickly obtained and, on the other, be quickly transmitted.

316. Battery commanders are concerned especially—

1. To examine the target assigned and endeavor to determine clearly its nature, its extent, and its relation to surrounding objects.

2. To study the terrain in the neighborhood of the target; locate, if possible, any ravines, hollows, or obstructions which would hide the fall of projectiles, and decide whether it will be necessary or preferable to adjust the fire upon some particular part of the target rather than upon the whole front.

3. To select a suitable observing station for himself and to post auxiliary observing parties, if practicable, so that they may assist in the observation of fire.

4. To decide upon the method of laying, selecting an aiming point if indirect laying is to be used.

5. To decide whether the adjustment is to be by time or percussion fire; and whether by platoon or by battery.

6. To measure the front to be attacked and decide upon the method of distributing the fire.

7. To determine the firing data to be initially used, if the same have not been furnished him by the battalion commander or reconnaissance officer.

317. The time available for the performance of the foregoing duties depends entirely upon the nature of the action. In some cases they must be performed with the utmost celerity; in others the opportunity is afforded for deliberate and complete preparation before opening fire. ***Every effort must be made to reach the position in advance of the moment for action, and thus gain the opportunity to appreciate the situation and make the necessary dispositions for the prompt opening of effective fire.***

3. DISTRIBUTION OF FIRE.

318. The fire of a battery is usually distributed over the front assigned it for attack. Each gun must be given the direction necessary to bring it to bear on its proper section of the target.

When time fire is employed the following considerations are to be borne in mind:

(*a*) If the front to be attacked does not much exceed 12 mils in width, it is sufficient to converge upon the center of this front, as the dispersion of fire, when a considerable number of rounds is fired, will provide for covering the full front.

(*b*) Fronts which do not much exceed 35 mils may be covered effectively by a battery without sweeping.

(*c*) If the front much exceeds 35 mils, it may be divided up into sections and each section attacked in turn or sweeping may be employed. The choice depends upon the nature of the target and the circumstances of the case.

319. Knowing the width of his target in mils, the battery commander quickly decides whether to employ converging fire, fire without sweeping, or fire with sweeping.

In the two latter cases he secures distribution by assigning to each gun one-fourth of the front to be attacked.

If direct laying is to be employed, he indicates clearly to the chiefs of platoon the outer limits of the target, if these limits are not in themselves obvious; and each chief of platoon points out to his chiefs of section and gunners the part of the target on which their respective guns are to be initially laid. Or, if the case admits, the captain may himself communicate this information, as explained in paragraph 282.

If indirect laying is to be employed, a distribution difference equal to one-fourth of the front in mils is used.

If the front to be attacked is approximately equal to the battery front, a quick method is to start with parallel fire (par. 425) and then modify the distribution, if necessary, as the fire progresses, by appropriate changes in the deflection difference.

320. One turn of the traversing handwheel shifts the point of burst approximately 8 mils.

Therefore, in sweeping fire the front in mils covered by each piece will be equal to 8 times the number of rounds in the sweep; the front in yards covered will depend upon the range.

The number of rounds to be fired in the sweep is determined by dividing by 8 the number of mils in the front assigned to each gun to attack.

At 2500 yards range well-adjusted sweeping fire will cover the front assigned completely.[1] At longer ranges the front will not be completely covered, while at shorter ranges the sheaves of successive rounds will overlap.

For the attack of a large front two methods are applicable: (1) To divide the front up into equal parts and attack these parts in turn; (2) to form the sheaf at the outset so that it will cover the whole front and fire a sufficient number of rounds sweeping to cover the entire front.

If continuous or volley fire is to be used, the circumstances must decide which method is preferable. If time is not afforded for deliberate preparation, the first method is usually preferable; but if time is thus afforded, then the second method may often be found advantageous.

If the target is very oblique, different ranges may be assigned the different guns.

For examples in the distribution of time fire, see paragraph 433.

321. When *percussion fire* is employed, the nature of the target determines whether converging or distributed fire is to be employed.

If the target to be attacked has a continuous front, e. g., walls, obstacles, etc., this front may be divided up into sections of 10 mils each, and the sections attacked in turn, each gun taking its proportionate part. If the target has a much smaller front than 10 mils, the fire may be converged upon its center. If the target consists of artillery, each gun may be assigned a corresponding gun to attack, or several guns may be converged upon each opposing gun, depending upon the amount of artillery available.

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[1] When the mean height of burst of shrapnel is well adjusted, each gun is expected to cover effectively a front of 20 yards if one round is fired, 25 if two are fired.

The construction of the carriage permits a traverse of about 70 mils on either side of the axial line.

As sweeping fire is especially adapted for use in cases when the fire has been carefully prepared for upon definite hostile positions, time may be afforded for giving the initial direction with the gun set at the extreme right traverse, if necessary. The full traverse on the carriage may thus be utilized; but it is not contemplated that a single gun will be given such a width of front to attack as to make this necessary.

In determining the number of rounds to be fired sweeping, if the quotient obtained by dividing the front in mils assigned each gun by 8 is not exact, but consists of a whole number and a large fraction, then the next larger whole number is taken.

4. *DETERMINATION OF FIRING DATA.*

322. The necessary data are:

1. The deflection.
2. The angle of site (in the case of indirect laying).
3. The corrector (in the case of time fire).
4. The range.

The Deflection.

323. To overcome the effects of wind and drift, a correction in deflection may be necessary. Its amount is generally small, however, and with a little experience may be readily estimated.

The correction for drift is always additive; that for wind may be either additive or subtractive, depending upon the direction of the wind. The value of each correction is first estimated; they are then combined to secure the resultant correction.

The following rough rules may be of assistance:

1. To overcome drift, increase the deflection by 3 mils at ranges up to 3,500 yards, by 5 mils at the longer ranges.

2. To overcome a 10-mile cross wind, change the deflection in the appropriate sense by an amount in mils equal to the number of even thousands of yards in the range.

If the target is moving across the plane of fire, a further correction in deflection must be made to allow for the travel of the target during the time of flight. A rough rule for determining the value of this correction is given in paragraph 263.

324. When direct laying is to be used, the initial deflection setting may be fully determined by the foregoing rules.

325. When indirect laying is to be employed, there must also be determined the deflection setting which will cause each piece to be directed upon its target when its line of sight is directed upon the aiming point.

In unfavorable country it may sometimes require considerable ingenuity to direct the guns upon the target. The basis of the method to be usually employed is to select a common aiming point, determine the deflection which will cause the right piece when laid on the aiming point to be directed on its target, and the deflection difference which, applied in arithmetical progression to the deflection of the right piece, will give for each of the other pieces in turn the deflection necessary to bring its line of fire on the appropriate part of the target. The corrections for wind, drift, and movement of the target are applied with the proper sign to the deflection of the right piece.

If it is possible to direct the right piece upon its target by looking through the sight, or by occupying an elevated position in rear and looking over the line of metal, then the direction may be referred to an aiming point, as explained in paragraph 154. Or, if an observer posted near the position of the right piece can see the target, he may measure, by handbreadths, the B. C. ruler, or the B. C. telescope the angle in mils between the aiming point and target, and this may be taken as the deflection of the right piece. By taking post on a tower or ladder, by climbing trees, etc., ability to see the target may be gained.

But if the observer must be at a considerable distance from the guns, then the deflection of the right piece must be secured by measuring at the observing station the angle from aiming point to target and transforming this angle for use at the gun. Methods of effecting this transformation are described in paragraphs 428–432.

The ***deflection difference*** may be measured directly, if each gun can by any means be pointed at its appropriate part of the target. It may, however, be computed with great rapidity and with all sufficient accuracy by the method explained in paragraph 425.

326. The special advantage of a common aiming point for all the guns is that the officer conducting the fire may then most readily vary the distribution and shift the direction of his fire.

The fire having been directed upon one target, he may shift it to another by increasing the deflection if the shift is toward the left, by decreasing it if the shift is toward the right.

The change in deflection necessary for this purpose is determined by measuring, by means of handbreadths or the B. C. ruler, the angle in mils between the old target and the new.

327. It may often occur that, though the initial direction has been given by direct laying, yet the gunner, on account of smoke, haze, or the natural indistinctness of the target, is unable to quickly locate it after looking away. Gunners should, in consequence, be trained to always note some mark on the ground which will enable them either to find the target or to bring their guns back to the initial direction by using this mark as a registration mark (par. 344). If, however, the conditions are such as to render it probable that delay or inaccuracy will thus be occasioned, the captain should at once change from direct to indirect laying, as explained in paragraph 243.

Angle of Site.

328. If the target is visible from the position of the guns, the angle of site is measured by means of the sight and quadrant (par. 165), or by the B. C. telescope set up at the position of the guns; otherwise the angle must be measured at the observing station and transformed, if necessary, for use at the guns.

329. If the observing station is near the guns and approximately at the same level, the angle measured at the observing station is used without change at the guns.

330. If the observing station is near the guns, but at a different level, the angle measured at observing station is corrected as follows: Estimate the difference of level in *yards* between observing station and guns; convert this difference into *mils* by dividing by the number of thousands of yards in range to target,[1] and apply the result with the proper sign as a correction to the angle of site of the target as measured at the observing station.

Example:

Angle of site measured at observing station ----- = 320 mils.
Estimated height of observing station above guns = 30 yards.
Range to target (measured or estimated)------- = 3, 300 yards.

$$\text{Correction} = +\frac{30}{3} = +10 \text{ mils.}$$

Angle of site at guns = 320 + 10 = 330 mils.

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[1] It is sufficiently exact in the usual case to take as the divisor the whole number representing most nearly the number of thousands of yards in range. Thus 3 instead of 3.3 in the example given.

331. If the observing station is not near the guns, the angle measured at the observing station is corrected as follows: Determine the difference of level in yards between observing station and guns (L_g) and between observing station and target (L_t).[1] Determine the difference of level in yards between gun and target by taking the sum of the foregoing differences if the observing station is at a level intermediate between the gun and target, by taking their difference if the observing station is above or below both the gun and target. The result is affected with a positive sign if the gun is below the target, with a negative sign if the gun is above the target; and it is then converted into mils by dividing by the number of thousands of yards in range. Applying this correction to 300 with the proper sign, we have the angle of site at the gun.

The operations to be performed in effecting this transforma-are set forth in detail in the Field Artillery Data Book.

Example:

Difference of level between observing station and gun, in mils .... $(S_g) = -50$
Difference of level between observing station and target, in mils .... $(S_t) = +10$
Distance from observing station to guns, in yards .... $(BG) = 1,200$
Distance from observing station to target, in yards .... $(BT)' = 4,500$
Distance from guns to target, in yards .... $(R) = 3,000$

$$L_g = -50 \times 1.2 = -60$$
$$L_t = 10 \times 4.5 = 45$$

$$\text{A. S.} = 300 - \left(\frac{\frac{L_g - L_t}{R}}{1000}\right) = 300 - \left(\frac{-60-45}{3}\right) = 300 + 35 = 335.$$

332. If a very broad target is to be attacked and it is situated on a hillside sloping sharply at right angles to the plane of fire, it will generally be necessary, in order to secure exact adjustment of the fire, to vary the angles of site by a common difference from one flank of the line of guns to the other. The value of this common difference may be determined by finding the difference in angle of site between the two flanks of the target and dividing this difference by the number of guns firing.

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[1] This difference may be determined by measuring by means of the B. C. telescope the difference of level in mils. and converting this difference into yards by multiplying it by the number of thousands of yards in the distance from observing station to gun or target.

333. An error in the angle of site has the effect of raising or lowering the trajectory by the amount of this error, and hence of giving the projectile a greater or less range than that expected from the setting used on the range scales of the quadrant and the fuse setter. To bring the trajectory upon the target, the range setting must be diminished or increased. As the fuse is then set for this erroneous range and not for the true range to the target, its time of burning will be too short or too long, and consequently the projectile will burst too high or too low, as the case may be. The corrector must hence be modified in order to bring the mean point of burst to the desired height.

If the error has not been very great, it may be readily overcome by a proper use of the corrector scale; but if the error is very large, great delay may result in the adjustment of height of burst. (See Example V, par. 418.)

The importance of determining the angle of site within the smallest possible limits of error is thus emphasized.

Corrector.

334. The corrector setting should be such as will cause the mean point of burst to be about 3 mils high during fire for effect; about 1 mil high during fire for adjustment.

Corrector 30 is supposed to give the mean height of burst of 3 mils. But, due to variations in powders and fuse compositions and to the errors of the day, the most suitable corrector for the day must be determined in each individual instance. Hence at the commencement of fire a trial corrector must be taken, and as the fire progresses this must be modified, if necessary to secure the desired adjustment of the height of burst. This trial corrector is such as previous experience with the powder charge and fuse composition suggests.

A change of 1 mil in the corrector should produce a corresponding change of 1 mil in the mean height of burst, raising it if the corrector is increased, lowering it if the corrector is decreased.

The mean height of burst having been established at one range, the corrector used should give the same mean height of burst at any other range, provided that direct laying is being used or that, in case of indirect laying, the proper angles of site are employed at the different ranges.

Range.

335. The initial range may be determined by means of a range-finding instrument, by the B. C. telescope and a measured base, by the use of maps, by sound, or by estimation. Every auxiliary means the use of which the time available permits, should be employed to assist in the measurement of the range, since upon its correct predetermination success in producing prompt effect depends. In many cases an officer must rely upon his own estimate of the distance. By constant practice it is possible to gain the ability to estimate distances very closely, and it is imperative that artillerymen should acquire this ability.

SECTION II.—*Conduct of fire.*

1. GENERAL PROVISIONS.

336. ***Conduct of fire*** consists in employing the technical means necessary to cause fire of the desired nature to be brought to bear upon the target.

The officer charged with the conduct of fire must be the master of the fire of his guns; must be able to turn the fire promptly upon any target at will and to regulate its intensity and distribution as circumstances require. The attainment of this condition requires complete familiarity with the weapons at his disposal, skill and quick decision in their use on the part of the officer, and thorough fire discipline on the part of the organization concerned.

337. ***Conduct of fire*** is ordinarily the function of the battery commanders, while fire direction is the function of the higher field artillery commanders.

338. In the general case the higher field artillery commanders assign duties to their subordinates, specifying clearly and as succinctly as possible the tasks to be accomplished by each; they exercise supervision over the expenditure of ammunition, giving such special directions as may be necessary to insure the same being used to the best advantage to meet the requirements of the various phases of the action; they assist their subordinate commanders by keeping them supplied with all attainable information which will aid in the adjustment or employment of fire; but they refrain from interfering in the details of conduct of fire or the service of the guns, interposing only when it is perfectly obvious to them, after careful observation of the fire, that the desired results are not being attained.

339. Cases may arise, however, where it will be necessary for the higher field artillery commanders to themselves conduct the fire of a part or of the whole of their commands. Such cases are most likely to occur in close country, where targets visible to the higher commanders may not be visible from the stations of subordinate commanders.

340. If the officer conducting the fire is separated from the position of the guns, the senior officer present with the guns acts as his executive, receives and transmits the firing data, and watches over the fire discipline of the command.

The station of the executive is established near the guns, in a location from which he can most readily exercise his functions and communicate with all the elements of the command. The location should be so chosen as to facilitate establishing telephone or signal communication with the station of the officer conducting the fire. The guns are fired at the command or signal ***commence firing*** from the officer conducting the fire.

If the officer conducting the fire and his command are sufficiently close to each other, communication is had by megaphone without the intervention of an executive.

2. *PRINCIPLES GOVERNING THE CONDUCT OF FIRE.*

341. The fire of artillery comprises in principle a fire for adjustment followed by a fire for effect.

The preliminary adjustment may be dispensed with only when the necessary data have been determined by previous fire or when the range is very short.

By skillful preparation of fire, however, the time required to secure adjustment may be greatly abridged, and the ability may be gained to strike a vulnerable enemy by surprise with fire which is from the outset effective.

Fire for Adjustment.

342. Adjustments of three kinds are called for, viz:

1. In direction.
2. In height of burst (in case of time fire).
3. In range.

The adjustment in direction involves bringing the sheaf of fire to bear on the desired front of target. Modifications of ***deflection*** setting are hence called for.

The adjustment in height of burst involves the determination of a ***corrector*** setting which will cause the mean point of burst to be at the normal height.

The adjustment in range involves the determination of a ***range*** setting which will cause the mean trajectory to pass through the target, or, if this is not practicable, the range settings corresponding to the front and rear limits of a zone which surely contains the target.

343. By observing the points of burst or fall of projectiles and judging their relative positions with respect to the target, the modifications in the deflection, corrector, and range settings requisite for adjusting the fire upon the target are determined.

344. In the general case fire for adjustment immediately precedes fire for effect.

If the circumstances permit, however, advantage may be taken of lulls in the action to secure at least a rough adjustment upon localities in which the enemy is known to be or near which he is expected to appear. Such a fire is termed ***fire for registration.*** The data are thus secured for opening promptly an effective fire upon an enemy appearing at or near the positions upon which the fire has been registered; by minor modifications in these data a quick adjustment on the target may be secured. The registration is usually effected upon prominent features of the terrain (termed ***registration marks***) near which the enemy is known to be or expected to appear. (Par. 458.)

Fire for registration, however, should never be used in action, except when the presence of our artillery has been revealed by previous firing.

345. The adjustment is effected upon the target itself, if practicable.

In many cases, however, the target itself will not be visible to the officer conducting the fire, though its approximate position may be known. Thus the target may consist of troops concealed behind a ridge, or behind a wall or hedge, or in the edge of a village, a forest, or a field of standing grain.

Some prominent feature of the terrain in or near the enemy's known position—as, for example, a tree, a house, a mass of rock, etc.—is then selected as a registration mark, and by means of scouts, observers in balloons, or any available means, the enemy's location with respect to this mark is determined within the narrowest possible limits.

The fire is then adjusted upon the registration mark, and the area within which the target has been located is searched by the subsequent fire.

346. During the adjustment the fire may be either concentrated or distributed. If observation is difficult, concentration upon the most prominent part of the target is usually called for; if observation is easy and the front to be attacked is not great, the fire may be distributed from the beginning.

If several batteries are adjusting simultaneously upon a single broad target, then it is generally best for each to concentrate during the adjustment upon the corresponding part of its section of the target—for example, the windward flank.

347. The choice of the projectile to be used depends upon the nature of the target and its situation.

During fire for effect time fire is, as a rule, employed against animate targets, percussion fire against inanimate targets.

348. The range may be most accurately determined from the observation of percussion bursts. Frequently, however, irregularities or the nature of the ground prevent the observation of percussion bursts; so that bracketing between low time bursts is to be regarded as a usual method.

For the quick adjustment upon troops in the open, fuses may be set from the commencement of the fire, but with a corrector which will surely give low bursts and a large percentage of bursts on graze. The opportunity is thus given to observe both bursts in air and bursts on graze. The visibility of the former is little affected by the profile of the ground and the state of the soil, and, taken in connection with the latter, they enable the observer to quickly determine the irregularities of the ground in front and rear of the target. Moreover, considerable effect may be produced during the adjusting series, and, by a small change in the corrector, passage to fire for effect may be quickly, effected.

349. The method of fire to be employed in the adjustment depends, also, upon the nature and situation of the target.

Against troops exposed in the open, battery salvos with time shrapnel are generally to be preferred. If such targets are of minor size or importance, however, platoon salvos may be employed.

Against troops in trenches or otherwise immobilized, against inanimate targets, and in the registration of fire, the rough adjustment is usually secured by a single platoon, the fire being directed upon the most prominent part of the target or registration mark. The exact adjustment in range, and also, if necessary, in the height of burst and distribution, is then secured by salvos or continuous fire executed by all the guns which are to take part in the subsequent fire for effect.

350. Guns which do not take part in the fire for adjustment are kept laid on the target with the data last ordered, and made ready to participate instantly in the fire as soon as a command or caution affecting them is given (par. 288).

351. It may be necessary in some cases to assign special targets to certain pieces or to certain platoons. In such cases the chief of section or the chief of platoon conducts the fire of his gun or guns, unless the captain gives other instructions.

Fire for Effect.

352. Depending upon the nature of the target and upon the accuracy with which the adjustment has been secured, the fire for effect may be of two general kinds, viz: (1) ***Fire at a single range,*** and (2) ***Fire at successive ranges*** (or ***searching fire***).

353. ***Fire at a single range*** is appropriate when the firing data for the enemy's position have been determined by previous fire. Thus it is adapted to the attack of all stationary targets upon which an exact adjustment has been secured, or for the attack of moving targets as they reach a position upon which the fire has been previously registered. If the fire is properly adjusted, the necessary effect may be produced with the minimum expenditure of ammunition.

354. ***Fire at successive ranges*** is appropriate when it has been impracticable to secure exact adjustment upon the target. Due to uncertainties of observation, especially at long ranges, exact adjustment is often difficult of attainment; within the time allowed by the tactical conditions it may be impossible of attainment. In such cases the preferable course is to inclose the target within the smallest limits that can be determined with surety and reasonable promptness, and then to search the area thus inclosed by fire at successive ranges.

If possible, a 100-yard bracket is always obtained, and the fire is delivered at the short, the mid, and the extreme ranges of this bracket until the most effective range can be determined. Whatever the limits determined, however, the fire is closely observed, ranges which are evidently ineffective are rejected, and the area to be searched thus gradually reduced to the smallest possible limits.

The time required to produce the requisite effect and the expenditure of ammunition may both be greatly reduced if, by reconnaissance, the enemy's positions are well determined and if, by auxiliary observers pushed well to the front and flank, information is obtained which will assist in the adjustment of fire.

The searching of areas is never to be resorted to unless it can be definitely determined that the enemy is actually located within the area selected, and unless he would evidently exercise a material influence upon the progress of the combat if left undisturbed by fire.

3. OBSERVATION OF FIRE.

355. The officer conducting the fire should be posted where he can observe not only his immediate target, but as much as possible of the terrain liable to be assigned him to attack. Unembarrassed by details of the service of the guns, he should devote himself to observing and correcting the fire and adapting its employment to meet the requirements of the situation. He should train himself to form accurate and quick estimates and to act on them with decision and boldness.

356. To overlook ground which is invisible to the officer conducting the fire, as well as for the purpose of assisting generally in the adjustment of fire, free use is to be made of auxiliary observing parties.

357. Such parties occupy the most favorable observing stations which the conditions of the combat admit. Preferably they are as near the enemy as possible. If near the guns, they are posted usually on the flanks and in elevated positions, if possible; for example, in the tops of trees, on buildings, on artificial towers, etc.

358. Their special duties are to signal information which will assist in the adjustment of fire and to keep the artillery commander informed of movements of the targets or of our own troops which would affect the employment of fire.

359. With respect to the adjustment of fire, they indicate especially whether the range is ***short, over,*** or ***correct;*** whether the ***burst interval,*** when in front of the target, is too ***great,*** too ***small,*** or ***correct;*** whether the direction is ***right, left,*** or ***correct.***

If large errors in range are made, an observer on the flank of the guns will not usually be able to separate the errors in range from those in direction; in such a case the observer would ordinarily signal the direction only, as ***right*** or ***left,*** as it appears to him, and the officer conducting the fire, knowing the position of the observer, would deduce the sense of the salvo, volley, etc., in range. If the observer is to the right of the line of fire, shots striking ***short*** of the target appear to be to the ***left,*** while those striking ***over*** appear to be to the ***right;*** and vice versa if he is on the left of the line of fire.

360. With respect to movements of the enemy, the observer reports especially: If the enemy abandons his position; if he shifts to the right or left, front, or rear, to escape effective fire; if additional hostile troops enter the sector assigned to the guns.

361. With respect to our own troops, the observer makes such reports as to their movements and situation as will enable the artillery commander to best assist them with the fire of the guns.

362. Arrangements should, moreover, be made with advanced troops of the other arms for the transmission of information which will assist in the adjustment of fire and for the indication as to when fire should be commenced or discontinued.

363. Sure and definite means of communication must be established between the artillery commander, his observing parties, and advanced friendly troops. If time admits, telephone communication is provided; but visual signaling must always be relied upon to a greater or less extent.

364. For observation of fire, for study of the terrain, and for the quick recognition of objectives, good field glasses are indispensable. All officers, agents, signalers, and scouts of field artillery should be equipped with suitable glasses.

365. At the commencement of the fire it is usually best to watch for the burst of the shots with the unaided eyes, for if a large error is made the bursts may not appear in the field of view of a telescope or field glass. After the bursts have been located the glasses may be quickly brought into play, if necessary, and the relative position of the smoke with respect to the target noted.

After the fire has been approximately adjusted the points of burst are observed by the aid of field glasses or the telescope, and all the indications carefully noted which assist in the determination of their relative positions with respect to the target.

Observation of Errors in Direction.

366. Errors of direction and of distribution may be measured by means of the B. C. telescope, the ruler, or by hand breadths. Small errors may usually be estimated with sufficient accuracy by eye.

The measurement or estimation of these errors may best be made when the observer is near the line joining guns and target; viewed from the flank, the error in direction is complicated with that in range.

Observation of Errors in Height of Burst.

367. The height of any particular burst may be measured by means of the B. C. telescope. The mean height of a salvo may also be estimated with considerable accuracy, if the bursts as they occur are noted with respect to the horizontal lines in the field of view of the telescope, and an average is then made. The middle line indicates the normal height of burst; the upper line twice the normal height.

The observer must also be trained to estimate by eye the height of a single burst or the mean height of a salvo.

368. When the mean point of burst is at the height appropriate during the adjustment (1 mil), about one-fourth of the shrapnel may, on account of errors of the fuse, laying, etc., be expected to burst on graze.

A check is thus afforded on the adjustment of the height of burst, provided a considerable number of rounds fired with the same fuse-setting are observed.

369. In the accurate adjustment of time fire not only the height but also the burst interval is important; for projectiles bursting too far in front of the target and those bursting in the air above it produce little or no effect. The burst interval is correct when both the range and the height of burst are correctly adjusted. Indications that such is the case are: (1) That the bursts on graze bracket the target; (2) that the mean height of burst is about 3 mils; (3) that fragments from the time bursts strike the ground both in front and rear of the target, and that the pattern made by these fragments (as revealed by the dirt and dust knocked up) is close and dense rather than greatly extended; (4) that obvious effect is produced upon the target.

If doubt exists as to the burst interval, it is best to diminish the corrector and get a group of low bursts and bursts on graze.

Observers posted well to the flank of the line of fire may be of the greatest assistance in determining and correcting errors in the burst interval.

Observation of Errors in Range.

370. It is rarely possible from a position near the guns to estimate with any accuracy the amount of the error in range. Such estimates are usually too small, and timid and insufficient changes in the range are consequently made. Delay in adjusting the fire thus often results.

Attention should rather be concentrated on deciding whether salvos or shots are ***short*** or ***over***, and on quickly inclosing the target with fire which is surely short and fire which is surely over.

By gradually narrowing the bracket thus determined an accurate adjustment may be secured.

A salvo is termed ***short*** (—) if the majority of its bursts are short, ***over*** (+) if the majority are over, and ***bracketing*** (±) if half are short and half are over. Bursts ***at the target*** may be included either with the ***shorts*** or the ***overs***, as the circumstances dictate.

If the bursts of a bracketing salvo occur on graze, the indication is that the range of the salvo was correct; if they occur in air, that the range was approximately correct, but somewhat too great.

If the sense of a salvo can not be definitely decided upon, it should be noted as ***doubtful*** (?) and disregarded.

The observer should train himself to decide quickly upon the sense of a salvo as ***short, over, bracketing,*** or ***doubtful***. It may be necessary, however, to allow time for the smoke to form and reveal its relative position with respect to the target.

371. If the observer is at a considerable elevation above the target, or the target is on ground sloping toward the observer, the sense of a salvo (***short*** or ***over***) may usually be recognized readily by noting the relative position with respect to the target of bursts on graze or fragmental hits from bursts in air.

372. But if the target and its vicinity can not be seen from a superior elevation, if the ground near the target is at about the same elevation as the observer, or if the ground in front or rear of the target can not be viewed, the deductions as to the sense of the salvo are to be formed especially from the manner in which the puffs of smoke from the bursts appear with respect to the target.

373. A burst on graze causes a column of smoke and dirt to be thrown up from the ground. In the case of a common shrapnel, this column is relatively small and fugitive; in the case of a high-explosive shrapnel or shell, it is large and remains visible for some time.

374. A burst in air produces a ball of smoke which ordinarily remains together for some time.

The bullets and fragments from a burst in air knock up a considerable amount of dirt and dust if they strike dry soil; on wet soil splashes of mud are knocked up by the shrapnel case and large fragments. In either case valuable indications are thus furnished as to where the trajectory prolonged reaches the ground.

375. If the target is silhouetted against the smoke of the burst, the latter may always be considered as ***over,*** whether the the burst occurred in air or on graze.

376. If the target is obscured by the smoke of the burst, the latter may be considered as ***short;*** but, in the case of a burst in air, the burst must be low in order to warrant this conclusion.

377. If the target is indistinct and of about the same color as the smoke, it may be less visible against the smoke as a background. A burst beyond the target may, for this reason, sometimes seem to obscure the target and hence be judged ***short,*** when it is in reality ***over.*** On the other hand, some targets become very much more visible if projected against a smoke background.

378. If the wind is blowing up or down the range, a decision should be formed quickly as to the relative position of the smoke with respect to the target. But if the wind is blowing across the range, it may be better to wait until the smoke has drifted across the front or rear of the target. To secure this result it may be desirable to direct the fire for adjustment at the windward flank of the target.

379. It is necessary to study carefully the ground near the target and locate ravines or hollows which might catch and hide the bursts of projectiles. The smoke from such bursts is apt to rise and reveal itself after a time, but false deductions may be drawn from it. Thus the smoke from a burst *short* of the target may have become so much dissipated by the time it appears that the target may be seen through it and the impression produced that the target is silhouetted against the smoke. Moreover, if a strong cross wind is blowing, the smoke, when it appears, will probably be at some distance to the flank of the actual point of burst, and erroneous conclusions as to the direction of the salvo may thus be reached. Such false deductions may be avoided, however, if the lay of the ground is appreciated and taken into consideration.

380. In adjusting fire upon a crest great care must be taken to reach this crest and not be deceived by a crest parallel to the crest sought, but short of it. In rolling country such an intermediate crest is often present, and it may merge itself into the background formed by the higher ground in its rear, and hence escape detection, while, as a matter of fact, there may be a broad valley or depression between the two crests. Shots which strike on the near side of the intermediate crest may be taken as establishing the short limit of the bracket, while shots which pass over the intermediate crest, burst low or on graze in the valley between the two and are lost, may be considered to have cleared the farther crest, and hence may be taken as establishing the long limit of the bracket. Such deceptions may be avoided by obtaining bursts in air on the line joining observer and the crest sought. If the ball of smoke is cut in two by the crest and the crest clearly defined against it, the burst is *over,* while if the crest is concealed by the smoke the burst is *short*. The short bursts may often serve to reveal the existence of the intermediate crest by causing the latter to be silhouetted against the smoke.

381. The existence of unexpected ravines and hollows may sometimes be deduced from the fact that while bursts in air are seen, the points of impact of the fragments with the ground are not revealed by the dust and dirt knocked up.

382. If the sun is shining, information as to the sense of bursts in air may often be obtained by observing the shadow on the ground of the ball of smoke produced by the bursts. The height of the burst and the position of the sun must, however, be taken into consideration.

383. If the sense of the bursts is *doubtful,* circumstances must decide whether to repeat the round or to change the firing data for the next round.

If smoke or the fire of other batteries have interfered with observation, a salvo concentrated upon some prominent part of the target may be of assistance.

If the doubt was occasioned by the fact that the bursts were in air and high, it may be well to merely diminish the corrector for the next salvo. The sense of such salvos may often be determined, however, by observing the points of impact of the shrapnel cases.

Abnormal bursts, when indirect laying is used, frequently indicate an error in the angle of site. When this error is considerable, steps should be taken at once to make the necessary corrections, otherwise data obtained from firing at one target are of little assistance in ranging upon another.

If a salvo is lost, the projectiles have probably burst in a ravine or behind some intervening cover. If the smoke of the bursts does not rise and become visible after a few seconds, the lay of the ground will determine whether to increase or diminish the range or merely to increase the corrector so as to obtain visible bursts in air. Definite information may generally be most quickly obtained in such cases by securing time bursts just above the level of the crests or other cover.

4. *RULES OF FIRE.*

384. Due to the various causes of error, a series of shots fired with the same data will probably vary more or less in their points of burst or fall. Hence in the adjustment of fire minor changes in the firing data should not be made on the basis of the observation of single shots in a series.

385. To procure an exact adjustment, changes should be made only after observation of a group of shots fired with the same data. The position of the mean point of burst of the group with respect to the target is estimated, and such corrections as may be necessary are made on the basis of this estimate.

Adjustment of the Direction.

386. When direct laying is employed the platoon commanders make such changes in deflection as may be necessary to bring the fire of their guns to bear upon the proper portion of the target. The direction and the distribution are thus simultaneously adjusted by the same correction.

387. When indirect laying is employed the officer conducting the fire adjusts the sheaf both in direction and in distribution.

To throw the sheaf to the right, decrease the deflection; to throw it to the left, increase the deflection.

To open the sheaf, increase the deflection difference algebraically; to close the sheaf, decrease the deflection difference algebraically.

If the platoon commanders are able to observe the fire, they make such minor changes in deflection as may be necessary to cause each shot to have its proper relative place in the sheaf. If they are unable to observe the fire, the officer conducting the fire makes these corrections.

388. To overcome observed errors in direction, the error is measured or estimated in mils and a corresponding correction in deflection is applied in the appropriate sense. The correction is habitually applied in even multiples of 5 mils until approximate adjustment in direction is secured, when a correction of less than 5 mils may, if necessary, be made.

389. If salvos or shots are lost, one or more high-bursting shrapnel fired from the directing piece will permit the determination and rectification of any error in deflection.

Adjustment of the Height of Burst.

390. Conclusions are to be formed from the observation of a group of shrapnel having the same fuse setting.

Battery salvos hence afford the quickest and most reliable means of adjusting the height of burst.

391. If the bursts of the first salvo are all on graze, the corrector should be increased by 5 mils for the next salvo, and, if necessary, still further increased from salvo to salvo by increments of 5 mils until bursts in air are obtained.

392. If the mean point of burst is too high, the mean height is estimated; its excess over *1 mil* is the error, and the corrector for the next salvo should be reduced by this amount.

393. If the bursts of a salvo are partly in air and partly on graze, the corrector may be kept unchanged during the adjusting series or until the observation of a considerable number of rounds has shown that too large a proportion are bursting either in air or on graze (par. 368).

394. If about one-fourth of the shrapnel have been bursting on graze during the adjusting series, on passing to fire for effect an increase of ·2 mils in the corrector should raise the burst to the normal height.

395. When indirect laying is employed, an error in the angle of site will cause a corresponding and equal error in height of burst. As the cause of the latter error will probably not at first be known, it will be necessary to attempt the adjustment of the height of burst by changing the corrector, as explained in paragraphs 391 and 392. If the error in height of burst is not great, it may readily be allowed for in this way; but if it is seen that the necessary correction will exceed the limits of the corrector scale, then the total correction which has been applied to the corrector must be transferred in the same sense to the angle of site, and a return to a corrector setting near the normal must be made.

At medium ranges a change of 4 mils in the angle of site produces a change of about 100 yards in range; hence, if the angle of site has to be materially altered, the adjustment of the range will have to be begun anew.

The foregoing emphasizes the importance of measuring the angle of site as accurately as possible, in the first place. It also shows that, when the firing data for indirect laying are passed from a battery in action to one just about to take part, not only the range, but also the corrector and angle of site which have been used with that range in securing the adjustment must be communicated.

Adjustment of the Range.

396. The range is determined or verified by bracketing; that is, by inclosing the target between rounds which, fired at a known difference of range, strike, respectively, short of and beyond the target.

If the first round is *short,* the range is increased; if *over,* it is decreased; and rounds are fired successively increased or decreased in range, as the case may be, until the target is bracketed. The change in range from round to round in this process of finding the first bracket is usually taken as 400 yards. Only in cases in which the range has been carefully predetermined, or in which observation is especially favorable, may a smaller change in range be safely employed.

Having bracketed the target, the size of the bracket may be successively reduced by halving the last bracket obtained; that is, by firing at the mean of the last two bracketing ranges. The extent to which this reduction in the size of the bracket should be carried is entirely dependent upon the nature of the target and the circumstances of the case.

397. If the target is surely included within the limits of the bracket finally accepted, it may be reached more or less effectively by subsequent fire. The first consideration, then, is to determine that fire at a certain range is surely short of the target, and that fire at another and longer range is surely over the target. A second but very important consideration is to reduce the difference between these two bracketing ranges as much as possible; that is, to obtain the smallest bracket compatible with the circumstances of the case.

398. If, during the bracketing process, the rounds fired at a given range appear to produce effect upon the target, additional rounds are fired at that range. If obvious and unmistakable effect is then observed, and the officer conducting the fire can be sure that his guns produced it, he may accept this range as the range of the target. But if any doubt whatever exists, he should *prove* the range before accepting it. This may be done by firing salvos at ranges 50 yards less and 50 yards greater than the range in question and noting whether in each case the bursts occur in the expected sense. If doubt is occasioned by the fact that other batteries are firing at the same target, a salvo with projectiles of the opposite type from those in use by the other batteries will usually be readily recognizable.

Percussion Fire:

399. Percussion fire is principally employed for the destruction of material objects, such as walls, buildings, obstacles, artillery matériel, etc. Such fire is termed ***fire for demolition.*** An accurate adjustment in range is requisite.

For the destruction of artillery matériel or other targets of low relief, light field guns may be used effectively up to 4,000 yards. To obtain effect upon such targets, a 25-yard bracket must be obtained.

The usual procedure in this case is to obtain a 100-yard bracket and to fire enough rounds at the limits of this bracket to determine definitely that fire at the near limit is short and that fire at the farther limit is over. One or more battery salvos are ordinarily required for this purpose. This bracket having been established, it is first narrowed to 50 yards by battery salvos at the mid range of the bracket, and from observation of this fire the range is changed by 25 yards in the appropriate sense. The 25-yard bracket having been obtained, continuous fire is begun at the near limit of the bracket. Changes in range of less than 25 yards should not be made.

Percussion fire is considered adjusted when, a 25-yard bracket having been obtained, it is evident that effect is being produced upon the target and when the number of ***shorts*** and ***overs*** is practically equal.

Time Fire:

400. Time fire is employed for the attack of animate objects. The nature of the target and the conditions affecting observation of fire determine the limits within which the range may be found.

401. When the target consists of troops immobilized in position—as, for example, infantry in trenches, artillery in battery, etc.—a 100-yard bracket is always obtained.

If the conditions are favorable for observation, the exact adjustment of the fire may be at once undertaken, as explained in the case of percussion fire. Before passing to fire for effect, however, salvos are fired at the mid range of the bracket for the final adjustment of the height of burst and the distribution. The fire for effect may be by continuous fire or by volleys.

But if the conditions are unfavorable for observation, it is preferable, after adjusting the height of burst and distribution, to direct the fire for effect successively at the short, mid, and long ranges of the bracket until it can be definitely determined at which range the fire is most effective. Salvos, continuous fire, or volleys may be used for the purpose.

If a 100-yard bracket can not be surely obtained—as, for example, in the case of moving targets, artillery concealed behind a crest, etc.—then the bracket obtained may similarly be searched by successive increments or decrements of 50 or 100 yards in the range, until it can be definitely determined at which range the fire is most effective.

Time fire is considered adjusted when it is evident that effect is being produced upon the target; when the great proportion of bursts in air are short of the target and at the proper mean height; when the shrapnel cases are seen to strike at or near the target; when dust, if seen at all, is knocked up by the bullets both in front and in rear of the target.

402. When the target consists of troops moving or liable to move the smallest bracket is obtained which can be surely and quickly established, and its depth is then promptly searched by the subsequent fire.

The usual procedure in such cases is to obtain quickly by bold changes of range a large but unmistakable bracket. Against troops moving at a trot or a gallop a 400-yard bracket is the minimum which should be attempted; against moving infantry, this bracket may be narrowed to 200 yards, which depths should be searched by volleys at successive ranges.

403. Whenever searching fire is employed it must be carefully observed with a view to securing a closer adjustment for subsequent fire. If fire at certain ranges is evidently ineffective, those ranges are rejected in the subsequent fire. If the conditions permit, the process of bracketing is resumed and a closer adjustment secured.

404. *Volleys* or *salvos* at successive ranges may be employed to search an area of any desired depth. The range ordered for the first volley or salvo is usually that corresponding to the short limit of the bracket. The fire is then continued progressively until the opposite limit of the bracket is reached by changes of 50 or 100 yards in range from volley to volley or from salvo to salvo, the time interval between volleys or salvos being such as the officer conducting the fire may deem appropriate. A range increment (or decrement) of 50 yards is ordinarily used if a 100-yard bracket is established, of 100 yards if a longer bracket is established.

405. If the area to be searched is not deep and the slope not great, a mean value of the angle of site may be taken, and a corrector used which will give low bursts at the near limit of the area if the slope is away from the guns, and bursts slightly above the normal if the slope is toward the guns. This method will always be used if great rapidity is desired. For searching long and steep slopes, however, it is better to use the angle of site of the near limit of the area to be searched and vary the corrector from volley to volley or salvo to salvo, increasing it if searching up the slope or decreasing it if searching down the slope.

406. If the ground either in front or in rear of the target can not be seen, or if the target is totally masked, every effort must be made to determine as accurately as possible the distance of the target from some feature of the terrain which is visible to the officer conducting the fire, and which may be used as a registration mark for the adjustment of fire. Thus, if a target is behind a crest the distance of the target from the crest line is to be determined; if the target is masked by trees and is so situated that the ground in rear of the target can alone be seen, some feature of the ground in rear of the target may be taken as the registration mark and the distance determined from it.

In such cases the fire is adjusted on the registration mark chosen and then shifted so as to search the area within which the target has been located. It is most important to have observers posted so that they can observe the fire and assist in its adjustment.

Verifying Salvos:

407. Salvos fired to verify the firing data in use, or to secure a more perfect adjustment of the fire before passing to fire for effect, are termed verifying salvos.

They are especially appropriate to fully establish the limits of a bracket; to determine definitely whether fire at a given range is really effective, as has appeared from the observation of previous but insufficient fire; to secure the final adjustment in direction, height of burst, and range, particularly in cases when only a portion of the guns have been used in the fire for adjustment.

If opportunity is afforded during the bracketing series to secure a satisfactory adjustment of the fire, verifying salvos are unnecessary, except that, in the case of a target moving toward or away from the guns, if any considerable time has elapsed since the establishment of that limit of the bracket toward which the target is moving, a salvo or salvos should be fired at the range corresponding either to that limit or to a point still farther in advance of the movement of the target for the final verification of the range before passing to fire for effect.

5. APPLICATION OF FIRE.

408. In service the fire of field artillery must be adapted to meet the requirements of many and ever-varying conditions. An infinite variety of concrete problems is afforded, and each problem will have its own best solution. Therefore great flexibility in the employment of fire is called for.

These Regulations set forth principles which are the bases of action and rules which may serve as guides in the average case; but they must not be looked to for ready-made solutions of the problems which arise in service. Having thoroughly mastered the principles of the Regulations and thoroughly grasped the possibilities of the gun and its equipment, an officer must so prepare himself that he will be able to recognize at once the means to be employed in any concrete case and be capable of putting such means into effect. Every latitude is allowed him in the choice of a method of fire and in its adaptation to the special case in hand. By constant practice in peace in employing fire (simulated or otherwise) to meet the requirements of a great variety of tactical situations, officers may prepare themselves to use their guns to the best advantage in war.

409. The special characteristics of the different methods of fire provided for in the text are outlined below, with some illustrations of their applicability.

410. *Continuous fire* is adapted especially to the demolition of material objects and to the attack of personnel inactive and more or less fixed in position and protected from fire.

The fire may be as rapid or as slow as desired, thus permitting the expenditure of ammunition to be exactly regulated to meet the requirements of the case.

Exact adjustment in range is sought; but if the conditions of observation are such as to preclude this, the smallest possible bracket is obtained and its depth searched by successive changes in the range.

411. ***Volley fire*** is adapted especially to the attack of personnel that are more or less vulnerable. The special characteristic of this method of fire is its great flexibility. The number of volleys to be fired, their range difference (if any), the number of rounds in each volley, are all in the hands of the officer conducting the fire. By suitable manipulations of the sheaf he may readily shift the fire from point to point of the terrain, as necessity may require, and by adapting the bursts of fire to meet the crises of the action he may utilize the ammunition to the best advantage.

If exact adjustment in range can be obtained, volleys at a single range are employed; otherwise volleys at successive ranges are used.

412. ***Salvos*** are adapted especially to securing the adjustment of fire. They may also be used for producing effect, and especially with the idea of obtaining at the same time additional information on which to base a more exact adjustment of the fire. They are employed at single or successive ranges, according to the principles of volley fire.

413. ***Fire at will*** is employed solely for the close defense of the guns from hostile attack. If the distant approach of the enemy is seen, then he is met by volleys, the range being successively decreased in accordance with his rate of advance, and the fire being held under rigid control until the last moment; but when it is seen that a rush for the guns is imminent, fire at will should be ordered.

Against a slowly moving enemy, such as infantry, the fire should be commenced when he has arrived within about 350 yards of the gun; against a rapidly moving enemy, such as cavalry, when he has arrived within about 800 yards; the purpose in both cases being to surely establish a fire-swept zone through which the enemy must pass in order to reach the guns.

414. Against infantry in position and more or less protected by entrenchments the fire should be carefully adjusted. As our infantry advances to the attack the intensity of the fire should be regulated to suit the necessities of the case, being slow or ceasing entirely while the enemy is concealed or inactive, rising to great intensity when the crises of the action develop and the enemy exposes himself to meet them. Continuous fire is indicated for the ordinary phases of the action, volleys for the crises, the object being to assist our own infantry: by inflicting as much damage as possible upon the enemy; by destroying his morale; by forcing him to keep under cover; and by preventing effective fire upon his part.

415. Against artillery in position the first object is to gain the ascendancy over it by inflicting as much damage as possible upon the personnel. Immediately effective fire is particularly demanded if the enemy can be attacked at a disadvantage, as, for example, while limbering or unlimbering. Obtaining a bracket as small as possible, searching the depth of the bracket, carefully observing the fire and securing as promptly as possible an accurate adjustment, are the means to be ordinarily employed in attacking the personnel.

Due to the difficulty, however, of reaching effectively the personnel of batteries provided with shields and posted in masked positions, the struggle between evenly matched artilleries will often be long drawn out. If the enemy's artillery is temporarily overmatched, it may suspend its fire and shelter its personnel; but it must be expected to renew the struggle as soon as the pressure upon it is relieved. The aim must be to gain the superiority of fire by suitable concentrations of effort on the part of our own artillery; the opportunity may then be gained to destroy the enemy's matériel by well-adjusted shell fire.

416. A slowly moving target such as infantry, or mounted troops impeded in their march, may be quickly bracketed by salvos and then attacked by searching fire.

Infantry in march formation may be thus attacked, but immediate deployment on their part is to be anticipated, and the officer conducting the fire should be prepared to reach them, probably behind cover, with a well-distributed fire.

Infantry moving to attack in deployed lines or in line of small columns may be met by volleys successively reduced in range as the infantry approaches. If their formation is in line of small columns, the fire should be distributed so that a piece or platoon may bear upon each of the small columns.

At close ranges infantry will probably endeavor to advance by successive rushes from cover to cover. Such rushes may be met by volleys previously prepared for upon selected positions, evidently in the immediate path of the enemy. If the positions occupied by important bodies of the enemy during the intervals of advance are well defined, accurately adjusted fire may be brought to bear upon such positions, and the ground between successive positions may be covered by searching fire when important movements of the enemy from one position to another are attempted.

417. In the case of a rapidly moving target, a bracket of 400 yards will ordinarily be quickly obtained and volley fire opened at that range which the movement of the target indicates would be most effective. Fire should be adjusted upon the target itself if practicable, otherwise upon some point ahead of its movement and which it will have to pass.

A target having once been brought under effective fire, its subsequent movements may be followed by volleys varying in range and direction, according to the rate and direction of march of the target.

418. The application of the methods of fire is further illustrated by the examples given below. In these examples the following nomenclature is employed:

Continuous fire	C. F.
Volley fire	V. F.
Fire at will	W. F.
By piece	P.
Platoon salvo	P. S.
Battery salvo	B. S.
Battalion salvo	Bn. S.
Deflection	D.
Deflection difference	DD.
Angle of site	A. S.
Corrector	C.
Range	R.
Burst:	
Air	A.
Graze	G.

Example I.

Situation: Surprise of a battery of the enemy's horse artillery advancing on a road which is bordered by fences. Direction of march making an angle of less than 15° with the normal to our front. No wind. Previous firing has indicated 33 as the corrector for the day.

Execution: Adjustment on head of target. B. C. decides to use volley fire with low-time bursts in adjusting, as rapidity is essential and effect may be obtained during the adjustment.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
V. F. 1	5	31	4,000 4,400	− −	3 3	1 1	Hostile battery takes trot and then gallop.
		33	[1]4,400	±	4	......	
V. F. 2	......	......	4,400	....	......	......	

[1] Due to the rate of travel of the target and the desire to block the hostile battery by obtaining hits on or near the head of column, B. C. decides to retain the range 4,400 for the third volley.

Certain carriages succeed in abandoning the road and are seen seeking cover on the flanks; remainder of column blocked on road. B. C. decides to destroy latter.

	......	......	4,400	....	......	......	B. C. decides to reject the 4,400 yard range as no longer effective and to search the depth 4,500–4,600.
	......	......	4,500	....	......	......	
	......	......	4,600	....	......	......	
	......	......	4,500	....	......	......	
	......	......	4,550	....	......	......	
	......	......	4,600	....	......	......	

EXAMPLE II.

Situation: A column of infantry is seen coming over a ridge and approaching a farmhouse, the firing data for which have been determined by previous fire. As seen from the battery the hostile column is moving from left to right, the line of march making an angle of about 800 mils with the line joining the farmhouse and the battery.

Execution: Battery commander forms the sheaf for parallel fire, directs its center upon the road near the farmhouse, and at the proper time commands, ***Commence firing.***

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
B. S....	3340	—5	285	27	4150	±	3	1	B. C.: Add 10.[1]
V. F. 3..	([2])	......	......	29	4150	....	....	....	

[1] B. C. notices that while salvo is effective it is somewhat to the right.
[2] D=3350.

Movement to the front ceases. B. C. decides to search the road to the right and rear of the enemy's leading troops. B. C. therefore shifts the sheaf to the left by 25 mils after each volley. He notes that the mean height of burst of the first volley was somewhat too low. He commands, ***Add 25.***

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
V. F. 3.	[1]	......	......	30	4300	....	....	....	B. C.: Add 25.
	[2]	......	......	......	4400	....	....	....	

[1] D=3375.

[2] D=3400.

Infantry disappears from view.

EXAMPLE III.

Situation: Battery in masked position. B. C. sees hostile battery taking up position in rear of crest. Heads of horses and mounted men visible.

Firing data for tree on crest determined by previous fire. Position of hostile battery near tree.

Execution: B. C. decides to fire an adjusting salvo and then search by volleys fired at successive ranges.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
By battery from the left.[1]	6210	+8	302	31	2500	—	3	1	Impact of shot plainly seen on slope near crest. B. C. Add 10.
V. F. 2.....	[2]	......	......	33	2550	....	....	....	
	....	......	......	....	2650	....	....	....	
	....	......	......	....	2750	....	....	....	

[1] A strong wind is blowing across the range from the right. The salvo is fired from left to right, so that smoke from the first shots will not interfere with observation of the last shots of the salvo.

[2] D=6220.

Enemy disappears. B. C. decides that if the hostile guns open fire or otherwise betray their presence he will search for them by successive volleys at ranges 2,550, 2,650, and 2,750 until he is able to get a closer adjustment by observation of the effect produced.

EXAMPLE IV.

Situation: Hostile battery suddenly reveals its presence behind bushes bordering a road by opening very effectively upon our infantry. Tops of their carriages visible from our guns, which are posted in observation.

Execution: Battery commander has formed the sheaf (par. 455) and directed it upon a selected registration mark.[a] By means of the B. C. ruler he finds the right of the target to be 130 mils to the left of the registration mark. He commands, ***Add 130*** and announces the corrector and range.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
B. S........	(1)	....	......	27	3000	+	2	2	B.C.: Subtract10.
	(2)	....	......	....	2800	−	4	0	B.C.: Add 5.
	(3)	....	......	....	2900	+	3	1	
V. F. 2.....	....	....	......	29	2800	....	....	....	
	....	....	......	....	2850	....	....	....	
	....	....	......	....	2900	....	....	....	

[1] D=2470. [2] D=2460. [3] D=2465.

Enemy ceases firing. B. C. seeks closer adjustment of the range; he has noted that fire at the 2800-yard range was evidently ineffective. The platoon commanders obtain an accurate adjustment of the direction, observing the fire from the tops of their caissons.

B. S........	....	....	......	24	2850	−	....	4	
	....	....	......	....	2900	+	....	4	
C. F........	....	....	......	29	2850	....	....	....	Interval 15 seconds.
	....	....	......	....	2900	....	....	....	
	....	....	......	....	2875	....	....	....	

EXAMPLE V.

Situation: The presence of a hostile battery behind a certain railroad embankment is revealed by the flashes of its guns.

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[a] The preliminary data announced for this purpose are: D=2340; DD= −5; A S.=290; C=27; R=3000.

Battalion commander directs one of his batteries to secure the adjustment.

Execution: Battery commander: Right platoon the adjusting platoon.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
P. S........	6110	+5	280	Perc.	3600	−	....	2	
	....	......	......	......	4000	±	....	2	Impact on embankment.
	....	......	......	......	4400	+	....	2	
	....	......	......	......	4200	+	....	(?)	Smoke seen rising behind embankment. Points of impact not seen.
	....	......	......	......	4300	+	....	2	Impact visible beyond embankment.

The ground hidden by the embankment is thus limited between 4000 and 4300, and range 4000 is seen to be ineffective. B. C. decides to adjust height of burst and distribution while still further searching this hidden area. Previous fire has indicated 33 as the corrector for the day.

B. S........	6,115	+6	......	33	4100	+	....	(?)	Smoke rising behind embankment.
	....	......	......	38	4200	+	....	(?)	Smoke rising behind embankment.
	....	......	......	[1]43	4200	+	3	....	1 lost.

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[1] There is evidently a large error in the angle of site. Corrector 45 appears from the subsequent firing to give the proper mean height of burst. This indicates that the angle of site is 12 mils too small. An error of 12 mils in the angle of site corresponds to an error of about 300 yards in range. A part of the discrepancy in range to embankment as determined by the range finder (3600 yards) and the gun (4000 yards) is thus explained.

Battery commander makes the corrections thus indicated, considers the target bracketed between 3700 and 3900 yards, and decides to search this area by battery salvos until he can secure the data for closer adjustment. Battalion commander sends an observer to the flank to endeavor to determine the relative position of the flashes of the hostile guns with respect to the embankment.

Example VI.

Situation: Flashes of enemy's guns are seen over a crest. The upper portions of a line of trees on the reverse slope beyond the crest are visible. The terrain is hilly and broken, and observation is difficult on account of haze.

Execution: Battery commander decides to adjust his fire with respect to the crest in front and the trees in rear and incorrectly begins his adjustment with shell.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
P. S........	3750	−5	312	Shell	2800	(?)	....	....	Lost.
	......	......	......	......	2400	−	....	2	B. C.: Add 15.
	(1)	......	......	......	2600	−	....	2	
	......	......	......	......	3000	(?)	....	....	Lost.
	......	......	......	......	3200	(?)	....	....	Lost. Smoke rising, apparently in front of crest; depression in front of crest suspected.
	......	......	......	35	3200	(?)	2	....	5 mils high. B. C.: Subtract 5.
	(2)	......	......	31	3200	−	2	....	Crest line obscured by smoke; no fragmental hits seen on crest.
	......	......	......	......	3400	+	2	....	The smoke from the bursts plainly cut in two by crest line; crest is thus bracketed between 3,200 and 3,400.
B. S........	......	......	......	......	3300	±	3	1	Burst on graze on forward slope of crest; fragments from bursts in air seen to strike the crest.
	......	......	......	......	3700	(?)	....	....	Lost.
	......	......	......	......	3500	+	3	(?)	Smoke plainly obscures the trees in rear.
	......	......	......	......	3600	+	(?)	(?)	Smoke rising from among trees.

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[1] D=3765

[2] D=3760

From his observation of the fire and from the circumstances of the case, the battery commander considers the target located between 3300 and 3500. He decides to search the ground by continuous fire at ranges 3300, 3400, and 3500, and be guided by his further observations and by the actions of the enemy as to subsequent adjustment and his subsequent method of fire.

EXAMPLE VII.

Situation: A battery is ordered to keep down the fire of a line of infantry entrenched on a ridge.

Front assigned 120 mils.

Execution: Battery commander seeks accurate adjustment in range. He converges the fire upon a prominent part of the target until the range is approximately adjusted and then distributes it to cover the full front.

An isolated bush near the enemy's left is taken as the aiming point and also as the object upon which to converge the fire at the outset.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
P. S.	o	(1)	295	Perc.	2500	–	....	2	Impacts are plainly seen on slope in front of trench, B. C.: Add 5.
	(2)	......	......	......	2700	+	....	2	
	......	......	......	......	2600	–	....	2	
B. S.	......	......	......	27	2600	–	3	1	
	......	......	......	......	2700	+	1	(?)	
	......	......	......	......	2650	±	2	2	
	......	+30	[3]295	29	2650	±	4	....	
	......	......	......	......	2650	±	3	1	
C. F. 4 rounds, sweeping.	......	......	......	29	2650	....	....	....	
	......	......	......	......	2675	....	....	....	

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[1] See par. 271 and par. 425, Rule II (P—T=8—8=0).

[2] D=5.

[3] As the ground slopes upward to the left and there is a difference of 15 mils in the angles of site of the right and left portions of the target, the battery commander orders that the angles of site be varied by increments of 4 mils from right to left.

A machine gun opens upon our infantry from right of enemy's line. Left platoon is directed upon it, the other platoon maintaining its fire.

Method of fire.	D.	DD.	A. S.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
Left platoon...	......	......	....	......	....	....	....	....	
V. F. 5.........	105	......	....	......	2650	....	....	....	

Our infantry makes an important forward movement.

All the guns, V. F. 4 rounds, sweeping	5	+30	....	......	2650	....	....	....	

Example VIII.

Situation: Enemy's infantry is seen advancing in line of small columns.

Execution: Adjustment on the front line of the advancing troops, each gun directed upon one of the small columns.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
B. S	5	28	3200	–	......	4	Enemy takes up the double time.
V. F. 1	......	33	3600	(?)	......	......	Presumably lost in woods beyond.
			3400	+	3	1	Enemy has now advanced beyond lower limit of bracket.
			3000	–	4	......	
V. F. 5	......	35	3000	....	......	......	

Infantry is seen to be advancing rapidly, in scattered order, to occupy cover to their front.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
	......	......	2,800	....	......	......	

It is obvious that the infantry, in large numbers, has taken shelter behind a certain low ridge. B. C. ordered to adjust on the ridge and search beyond, opening the sheaf to cover about 70 mils. He indicates to his platoon commanders the limits in width to be covered.

B. S.	......	33	2600	−	3	1	
			2800	+	2	?	
			2700	±	3	1	
V. F. 3 rounds, sweeping.	......	35	2700	....	......	......	
			2750	....	......	......	

EXAMPLE IX.

Situation: Our infantry moves forward to attack a village. The terrain is wooded and broken.

A battery is ordered to accompany the infantry with a special view to driving the enemy from shelter, which can not be reached effectively by our more distantly posted artillery, and to assisting our infantry in the later phases of the attack.

Execution: Movement from cover to cover, by fractions, if necessary.

Action by battery, platoon, or piece to overcome special resistance at points not reached by the other supporting batteries. Husbanding of ammunition until the last moments of the assault.

Battery is ordered to drive defenders from a wall from which a most galling fire has been coming. Left platoon the adjusting platoon.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
P. S	2	Shell.	1600	—	....	2	
			1800	+	....	2	
			1700	+	....	2	
B. S	....	....	1600	—	....	4	
			1700	+	....	4	
C. F	....	....	1650	....	....	....	Interval 10 seconds.
			[1]1675	....	....	....	
							Enemy's fire ceases.

[1] The details of the continuous fire are as follows:

1,650 yards.		*1,675 yards.*	
Round:		Round:	
First	—	Ninth	+
Second	—	Tenth	Hit.
Third	Hit.	Eleventh	—
Fourth	+	Twelfth	—
Fifth	—	Thirteenth	Hit.
Sixth	+	Fourteenth	Hit.
Seventh	—	Fifteenth	+
Eighth	—	Sixteenth	Hit.

1675 is accepted as the range and the fire continued at this range until the necessary effect is produced.

One piece is ordered to move to a position at head of ravine and drive defenders from a house.

P	0	Shell .	1300	....	....	....	
			1500	Hit...	....	....	Hit is seen to be high.
			1400	....	....	....	
			1450	Hit ...	....	....	
C. F	....	....	1450	....	....	....	Interval 15 seconds.
			1475	....	....	....	

Village taken. Battery limbers up and gallops to position near village and opens on retreating infantry.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
V. F. 2.........	....	30	1000	....	....	....	
V. F. 4.........	....	....	1100	....	....	....	
Etc.							

Example X.

Situation: Cavalry suddenly appears around spur of hill, about 1,500 yards away, and advances rapidly toward battery over open ground.

Execution: Battery commander takes range which is surely short, and opens rapid fire, his object being to establish instantly a fire-swept zone through which the enemy must pass to reach the battery.

Method of fire.	D.	C.	R.	Sense.	Burst.		Remarks.
					A.	G.	
V.F.5..........	0	[1]30	1100 800	....	....	....	

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[1] That corrector is employed which previous experience with the fuses in use has shown to be most suitable.

A portion of the cavalry passes through the fire-swept zone and continues rapidly toward the guns.

Fire at will....	......	......	....	....	....	....	

Example XI.

Situation: Enemy's artillery behind a certain low crest is causing loss to our infantry. Commander of a battalion of artillery from an elevated position well to the front and flank of his battalion is able to see the flashes of the enemy's guns and to determine that the guns are close behind the covering crest.

Execution: Battalion commander conducts the fire of his battalion, which is in line with the guns at 20-yard interval throughout. He employs during the preliminary adjustment, first the right platoon of the right battery and then the right battery, converging the fire upon the right section of the target. He secures the final adjustment by means of battalion salvos, distributed over the front to be covered. Adjustment on crest.

Method of fire.	D.	DD.	AS.	C.	R.	Sense.	Burst.		Remarks.
							A.	G.	
P. S......	3450	−10	305	Perc.	4000	+	....	2	On hillside in rear. Bn. C.: Add 20.
	(1)	......	......	....	3600	−	....	2	
					3800	−	....	2	On slope in front of crest. Bn. C.: Subtract 5.
	(2)	......	......	....	3900	+	....	(?)	Smoke rising behind crest. 5 mils high.
B. S......	....	......	......	35	3850	(?)	4	....	
				31	3850	±	3	1	The burst on graze is on the crest.
					3950	+	2	(?)	
					4000	....	1	2	2 of the bursts on graze are seen on the hillside in rear; the other is not seen.
Bn. S	....	[3]−8	......	33	3850	....	12	....	
					3900	....	10	(?)	
					3950	....	9	(?)	
V. F. 2...	....	......	......	....	3900	....	....	....	
					3950	....	....	....	

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[1] D = 3470.

[2] D = 3465.

[3] Battalion commander sees the flashes of six guns and finds the front occupied to be 25 mils. The distribution difference is = $\frac{25}{12}$ =2. The convergence difference is = −10. Hence DD = −8.

SECTION III.—*Dispositions and duties incidental to preparation and conduct of fire.*

1. *DETERMINATION OF THE DEFLECTION OF THE RIGHT PIECE AND THE DEFLECTION DIFFERENCE.*

Deflection Difference.

419. The principles involved in the determination of the deflection difference are best explained by assuming the target to be visible from the guns. Elementary instruction is best conducted, moreover, with the guns placed so that this will be the case, as a check may then be had on the computations made.

420. If the guns of a battery at normal or other equal intervals are, with zero deflection, laid accurately upon the same part of a target—for example, its right edge—and the lines of sight are then all directed upon a common aiming point, the deflection readings will be found to increase or decrease from right to left by a common difference. This common difference in deflection is termed the ***convergence difference.*** It is the deflection difference necessary to produce converging fire, being positive if the deflections increase from right to left, negative if they decrease.

421. The convergence difference may thus be measured directly if the guns are in position and the target can be seen through the sights. But the data should, in the general case, be obtained before the guns come up. Moreover, when indirect laying is to be employed the target is not usually visible from the guns. Direct measurement of the convergence difference is not then feasible in the usual case. By computation, however, its value may be quickly determined as follows:

(*a*) Determine the parallax[1] of the aiming point and the parallax of the target.

(*b*) The convergence difference is equal to the parallax of the aiming point diminished ***algebraically*** by the parallax of the

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[1] By the parallax of the target or aiming point is to be understood the angle subtended at the point in question by the width of a platoon front at the battery. Its value in mils is quickly calculated by dividing *20* (width of a platoon front) by the number of thousands of yards in distance from point to battery. Thus, if the distance to target is 2,800 yards, its parallax is 7. Fractions are disregarded in making the calculation, the nearest whole number being taken.

If the aiming point is to the rear of the battery, its parallax is always negative.

If the line from the position of the guns to the point whose parallax is sought is considerably oblique to the normal to the battery target. It is additive if this algebraic difference is positive, subtractive if it is negative.

422. Assuming the guns to be still converged upon the right edge of the target, their fire may now be evenly distributed over the whole front of the target if we retain the same aiming point for all the pieces and the same deflection for the right piece, but increase the deflection of each of the other pieces by an amount necessary to cause its line of fire to be directed upon its appropriate part of the target. The common difference in deflection necessary to effect this distribution is termed the ***distribution difference.*** Its value is obtained by dividing the front of the target, expressed in mils, by the number of guns in the unit firing. It is always additive, provided the right gun is directed upon the right section[1] of the target, and the difference is applied in arithmetical progression to the deflection of the right piece, to determine the deflections of the other pieces in turn from right to left.

423. The algebraic sum of the convergence difference and the distribution difference is the ***deflection difference.*** If converging fire is to be used, the distribution difference is zero and the deflection difference is therefore equal to the convergence difference.

424. The following nomenclature may be used to designate the terms referred to above:

DD------------------Deflection difference.
CD------------------Convergence difference.
F-------------------Front of target in mils.
P-------------------Parallax of aiming point.
T-------------------Parallax of target.
X-------------------Number of guns in unit firing.

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front, then a correction for *obliquity* is applied to the parallax. The necessary correction may be obtained from the table on the B. C. ruler. (See Handbook of 3" F. A. Matériel.) If the obliquity is less than 400 mils, no correction is necessary.

Refinements in the computation of parallax are uncalled for. With a little experience the values of the parallaxes of objects at the usual artillery distances are immediately appreciated; thus: 10 at 2,000, 8 at 2,500, 7 at 3,000, 6 at 3,500, 5 at 4,000, 4 at 4,500, and 4 at 5,000 yards. The integral number which comes nearest to the true value of the parallax is taken, the choice as between a higher and lower number being decided immediately in favor of the lower number, if a little obliquity exists.

[1] In shrapnel fire the right piece is directed, not upon the right edge of the target, but upon a portion of the target about 10 yards within the right edge. Each gun is supposed to cover a section 20 yards wide, this being about the effective width of the shrapnel sheaf.

425. Using this nomenclature, the relations brought out in the foregoing discussion may be expressed as follows:

Rule I: The convergence difference is equal to the parallax of the aiming point diminished algebraically by the parallax of the target; or, $CD=P-T$.

Rule II: For converging fire the deflection difference is equal to the convergence difference; or, $DD=P-T$.

Rule III: For distributed fire the deflection difference is equal to the convergence difference increased algebraically by the distribution difference; or, $DD=P-T+F/X$.

A special case of distributed fire is *parallel fire.* If the lines of fire are parallel they are directed upon points just a platoon front apart. Therefore, in Rule III, $F/X=T$ and $DD=P$. Hence we have

Rule IV: For parallel fire the deflection difference is equal to the parallax of the aiming point; or, $DD=P$.

426. The foregoing rules afford a method of determining the *deflection difference* necessary to produce either converging or distributed fire. If the pieces have a common aiming point and the right piece is given a deflection which will cause its line of fire to be directed upon the right section of the target, the desired convergence or distribution may be secured by giving the other pieces the deflection of the right piece increased (or diminished) by as many times the deflection difference as there are platoon fronts between the right piece and the piece considered.

Rule IV affords the quickest and readiest means of distributing the fire, since, to determine the deflection difference, we have only to estimate the distance to aiming point and compute the corresponding parallax. For the attack of targets having about the same front as the unit firing, the approximate amount of distribution is thus promptly obtained. If, after opening fire, the distribution appears too great or too small, then it may be promptly adjusted by modifying the deflection difference.

Deflection of the Right Piece.

427. If possible, the angle (A) from aiming point to target is measured at or near the position of the right piece by using the sights or any convenient means of reading horizontal angles. (Par. 446.)

If, however, the target can not be seen from the vicinity of the guns, then the observer posts himself where he can see the target, measures the angle, and transforms it for use at the guns.

428. This transformation may be effected (*a*) by the parallax method, (*b*) by the use of the field-artillery plotter.

The parallax method is used to the best advantage when the observing station is in prolongation of the line of guns and not more than 400 or 500 yards away. It is an extremely quick method, the necessary computations being readily made mentally after facility has been gained.

The plotter solves the problem in the general case, being independent, within the limits of its scales, of distance or direction. Its special purpose is to make the necessary transformations both of range and of direction when considerable distances separate the observing station and guns.

429. (*a*) The Parallax Method: To illustrate this method, let us assume that the observing station is on the right flank of the guns, in prolongation of their front, and at a distance of n platoon fronts from the right piece.

At the observing station the angle A, from aiming point to right section of the target, is read by means of the B. C. telescope or ruler. This angle may be considered as the deflection necessary to cause an imaginary piece at the observing station to be directed upon the right section of the target; the actual right piece, n platoon fronts away, may be converged upon the same part of the target by increasing (or diminishing) the deflection of the imaginary piece by n times the convergence difference. The process is then altogether similar to that before explained for causing convergence in an established line of guns. We have then

Rule V: The deflection of the right piece is equal to the angle from aiming point to target, as measured at the observing station, increased algebraically by as many times the convergence difference as there are platoon fronts in the interval between observing station and right piece; or, $D=A+n\ (P-T)$.

If the observing station is on the right flank, n is positive in the foregoing formula, negative if it is on the left flank.

430. If the observing station is not on the prolongation of the line of guns, but is in advance or rear of that line, the interval between observing station and right piece must be measured perpendicular to the line joining the right piece and the target.

In the latter case the data secured will probably be only approximately correct; but the error in direction should not be great, and errors both in direction and distribution should be readily corrected at the second salvo.

431. The parallax method thus outlined gives great facility in transforming the deflection, not only from an observing station to a battery, but from battery to battery along a line of guns having a common aiming point. A great variety of special cases will be met in practice, but if the possibilities of the method are fully grasped some adaptation will usually afford a solution. By constant practice in the solution of all sorts of cases readiness in the use of the method is to be obtained. The great advantage of the method is that it permits a rough approximation of the direction from gun to target to be quickly furnished. The approximation should be close enough to permit the first salvo to be observed; errors in the adjustment may then be quickly recognized and corrected.

432. (*b*) Use of the Plotter. At the observing station the distances to target, aiming point, and right piece are measured; the angles from aiming point to target and to right piece are measured by the B. C. telescope. The data as found at the observing station are then set off on the instrument, the protractor is moved along its slide a distance corresponding to the distance between observing station and right piece, and the range and direction of the target from the right piece are read off.

The *deflection of the right piece* is thus determined. Knowing the distances from right piece to target and aiming point, the *deflection difference* is readily found by Rule II, III, or IV.

433. In determining the data for indirect laying, the following is a summary of the operations usually necessary when an observing station on the flank of the guns must be taken and a suitable one can be found within 400 or 500 yards of the guns:

1. Select an observing station from which a good view of the target and its surroundings may be obtained, which is as close to the guns as the conditions permit and which is as nearly as possible on the prolongation of their front.

2. Select an aiming point which is surely visible to all the guns, whose direction is as nearly normal to the front of the guns as possible and whose distance from them is preferably not less than 2,000 yards.

3. Set up the B. C. telescope[1] at the observing station, measure the angle from aiming point to target, and while the telescope is on the target measure the angle of site and the front of the target in mils.

4. Measure or estimate the distance to aiming point and target and compute the parallaxes of each. Correct the parallax of the aiming point for obliquity if the line from right gun to aiming point makes an angle greater than 400 mils with the normal to the front of the guns.

5. Determine the convergence difference by Rule I, estimate or measure the distance to right piece, and apply Rule V for the determination of the deflection of the right piece. The distance is always measured or estimated to the *right* or directing piece.

6. Determine the deflection difference by Rule II, III, or IV.

7. Correct the angle of site, if necessary, for difference of level between observing station and guns, adopt the corrector which previous fire has shown to be the most suitable, and take the range as measured or estimated.

EXAMPLES.

Example 1: A battery is ordered to take a masked position and be ready to fire upon an indicated hostile battery whose range is known to be 2,100 yards. The battery commander finds an observing station 200 yards to the *left* flank and on the prolongation of the battery front. He selects an aiming point in rear, 5,000 yards away.

At the observing station he finds: A=2600 mils; F=30; A. S.=293. He notes that the observing station and guns are practically at the same level.

He computes:

$P=-20/5=-4$, or, $=-3$ when corrected for obliquity ($A=2600$).
$T=20/2=10$.
$P-T=-3-10=-13$.
$F/X=\frac{30}{4}=7$.
$DD=-13+7=-6$.
$n=-10$.
$D=2600-10\ (-13)=2600+130=2730$.

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[1] If time does not admit of the setting up of the B. C. telescope, the B. C. ruler may be used for the necessary measurements.

The battery commander commands:

1. *Aiming point, that chimney.*
2. *By battery from the right.*
3. *Deflection, 2730.*
4. *Diminish by 6.*
5. *Angle of site, 293.*
6. *Corrector, 28.*
7. *RANGE, 2100.*

Example 2: A battery which has just taken an unmasked position and is firing upon a disorganized enemy is directetd to turn its fire upon a large body of retiring infantry. From the position of the guns the target can not be seen.

The battery commander finds a place 150 yards to the right flank and slightly in front, from which he can see the target. Using the B. C. ruler, he measures the angle from a prominent tree to the column as 350 mils; he estimates distance to target as 2,500 yards, to aiming point 4,000 yards, to right piece 150 yards.

He computes:

$P=5.$
$T=8.$
$P-T=-3.$
$n=7.$
$D=350+7(-3)=329.$

He estimates the target to be on the level with his guns, decides to use parallel fire, and commands:

1. *Aiming point, that lone tree.*
2. *By battery from the right.*
3. *Deflection, 329.*
4. *Increase by 5.*
5. *Angle of site, 300.*
6. *Corrector, 28.*
7. *RANGE, 2500.*

The captain estimates the *direction* of the first salvo as 10 mils too far to the right, the *distribution* as somewhat too small, the *height of burst* as high (all four burst in air, mean height 9 mils), and the *range* as indeterminate (on account of the high bursts).

He commands:

Deflection, 339.
Increase by 7.
Corrector, 20.[1]
RANGE, 2500.

and fires such other salvos as may be necessary to effect the adjustment.

Example 3: Having fired upon the target of previous example until it disappears, the battery commander sees another body of troops whose range he estimates as 3,000 yards. Using the B. C. ruler he finds that this target is 200 mils to the right of the last target and that its angle of site is 295.

He commands: *Subtract 200,* and then:

1. *By battery from the right.*
2. *Angle of site, 295.*
3. *Corrector, 20.*
4. *RANGE, 3000.*

The last example is not an example of transformation of angles by the parallax method, but is introduced to show how readily the fire may be shifted from point to point.

Example 4: A battery is ordered to take a masked position in observation and be ready to assist in the attack of an entrenched infantry position. Front assigned=85 mils; measured range=2,500 yards.

By taking post on an observing tower about 50 yards in rear of the right piece, the battery commander is enabled to see the target. He designates an aiming point in rear, distance 5,000 yards, and finds angle from aiming point to target to be 3,450. He decides to take this angle as the deflection of the right piece without change.

He computes:

$P = -4.$
$T = 8.$
$P - T = -12.$
$F/X = 21.$
$DD = 9.$

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[1] See par. 392.

He decides to use the right platoon to secure the rough adjustment in range, and cautions: ***Right platoon the adjusting platoon***

1. ***Aiming point, as indicated.***
2. ***Deflection, 3450.***
3. ***Increase by 9.***
4. ***Angle of site, 291.***
5. ***Percussion shrapnel.***
6. ***RANGE, 2500.***

After securing the adjustment of the deflection and a rough adjustment in range, battery salvos are fired for the exact adjustment of the range, height of burst, and distribution, and then volleys sweeping or continuous fire sweeping are used, according to the degree of activity shown by the hostile infantry and the character of the assistance required by our own infantry.

For continuous fire the captain would command, for example:

1. ***Continuous fire.***
2. ***Three rounds, sweeping.***
3. ***Interval, 15 seconds.***
4. ***RANGE, 2625.***

For volleys:

1. ***Volley fire.***
2. ***Three rounds, sweeping.***
3. ***RANGE, 2625.***

2. OBSERVING STATIONS.

434. The officer conducting the fire should choose his observing station so that he can see all the territory assigned to him to cover, properly observe the fire of his guns, and promptly communicate with them.

To facilitate the quick transmission of orders and the proper exercise of command, the station should be as near the guns as the conditions permit.

Removal from the neighborhood of the guns may often be avoided by using elevated observing stations such as trees, buildings, etc., or a specially prepared ladder or tower.

When the observer is in immediate proximity to the guns, it is usually necessary for him to take post on their windward flank.

435. When masked fire is to be employed, the posting of the batteries is often greatly affected by the necessity of securing good observing stations. The commander of an isolated battery may have a wide latitude in the selection of his observing station. But when the guns of a battalion or regiment must be posted in the same general locality, observing stations on the flanks of interior batteries and at considerable distances therefrom are generally impracticable; for, even if the entire available front is not needed for the guns, observing stations on the flanks of interior batteries may unduly restrict the field of fire of adjoining batteries.

The batteries must hence be posted so as to take the best advantage of natural observing stations, and artificial stations must be erected where natural ones are lacking.

436. If the station is in immediate proximity to the guns or is apt to be subjected to the enemy's searching fire, suitable protection from hostile fire should, whenever possible, be provided for the observing officer.

3. AIMING POINTS.

437. When indirect laying is to be employed, the selection of a suitable aiming point calls for special attention. The aiming point should be:

1. Surely visible from the emplacement of each gun;
2. Distinctive and easily picked out;
3. At a considerable distance from the guns; and
4. Preferably near the normal to the line of guns.

If any doubt whatever exists as to the visibility of the aiming point, it is always best, before the guns come up, to go to the point where each gun is to be placed and make sure that the aiming point will be visible through the sights from that point.

Some object which quickly attracts the eye should be selected; and, if possible, it should be the only object of its kind in the vicinity, so that doubt, hesitation, and mistakes may not arise, either in the designation of the aiming point or in finding it quickly after looking away.

A distant aiming point is preferable, for the more the aiming point is removed from the guns the more are errors in calculation of parallax minimized; but it is not desirable to take inconspicuous aiming points. Usually points not less than 2,000 yards distant will be found most suitable.

A point in rear or in front of the guns and near the normal to their front is always to be preferred, provided it is at least 1,000 yards distant. If the aiming point must be closer than 1,000 yards, then it is best to have it on the flank.

438. If the distant aiming point is apt to be obscured by mist or smoke, then a secondary aiming point should be provided for. A stake may be put up for the purpose. The guns having been oriented on the target by means of the distant aiming point, the sights may, when necessary, be turned upon the new aiming point (as in par. 154) and the latter used in subsequent fire.

439. If an aiming point visible from all the guns and from the observing station can not be found, then some expedient must be devised for directing the guns upon their targets. The following are given as examples of such expedients:

Example 1: The guns are in a depression and all view of the surrounding country is cut off. No natural aiming points are available. The battery commander, mounted on an observing tower, can see the target provided his tower is placed in rear of the third piece.

Solution.—The battery commander places his tower in rear of third piece and, looking over the line of metal, directs the gun upon its appropriate part of the target.

He causes the gunner of the third piece to turn his panoramic sight upon the sights of each of the other pieces in turn and to read off the corresponding deflections. For pieces to the right of the third piece, this deflection is increased by 3,200; for pieces to the left it is diminished by 3,200. The resulting deflections are in each case set off on the sights of the respective pieces and they are then laid, using the sight of the third piece as an aiming point. ***Parallelism*** of the lines of fire is thus secured.

The direction of each piece may then (par. 154) be referred to an individual aiming point consisting of a stake driven in front or rear of the piece, or preferably to a common aiming point consisting of a stake or pole erected to the right rear of the pieces.

Example 2: Suitable aiming points can be seen from the guns, but none of them are visible from the observing station, which, on account of the lay of the ground, must be placed about 400 yards to the flank of the guns.

Solution.—The battery commander decides to designate his B. C. telescope as a temporary aiming point. He determines the deflection of the directing piece as follows:

(*a*) Sets the telescope at 3200, directs it upon the sight of the directing piece and clamps the lower limb; unclamps the upper limb, directs the telescope on the target, and reads the angle.

(*b*) Measures or estimates the interval in yards between telescope and gun, divides this amount by the number of thousands of yards in range to target, and thus procures the parallax of the target for the interval between telescope and gun.

(*c*) Adds this parallax to the angle measured by the telescope if the telescope is on the left of the guns, subtracts it if the telescope is on the right.

The result is the deflection to be used by the directing piece, the telescope being the aiming point.

Setting off this angle on the sight of the directing piece and using the B. C. telescope as an aiming point, the piece is laid on the target. The direction of this piece may then be referred to any suitable aiming point in front or rear of the guns (par. 154). By computing the deflection difference in the usual way, the deflection to be given the other pieces may then be determined.

4. FIRING OVER A MASK.

440. When a position for masked fire is to be occupied, it is necessary to make sure that the projectiles from each gun will clear the mask and reach ground which is occupied or is expected to be occupied by the enemy.

If the guns are already in position and the ***mask is not more than 200 yards in front,*** then the guns may be given the elevation and angle of site corresponding to the nearest expected position of the enemy, and a glance through the bores will tell whether the projectiles will clear the mask.

In the general case, however, this information should be obtained before the guns arrive, so as to preclude indecision and delay in posting them. It is necessary first to decide what is the shortest range at which we must be prepared to strike the enemy and what is the minimum angle of site to be used. We can then decide whether from the contemplated position of the guns the projectiles will clear the mask and reach the desired territory. If they will not, then we must quickly find the place from which they will.

To solve the problem, we determine the height of trajectory in mils at the mask and then compare this with the height of the mask in mils.

441. The sliding scale on the B. C. ruler may be used to determine the height of trajectory at the mask as follows:

1. Determine (*a*) the distance from guns to mask, (*b*) the difference of level in mils between guns and target, (*c*) the range to target.

2. Move the sliding scale on ruler until graduation indicating difference of level between guns and target is opposite that indicating distance to mask; then opposite graduation indicating range to target we will find ***height of trajectory*** (h) in mils at the mask.

3. Determine the height of the mask in mils. If it is less than h, the projectile will clear the mask; if not, move backward or forward until a point is reached where it is less.

442. Differences of level in mils may be determined by means of the B. C. telescope, by subtracting 300 from the angle of site and preserving the proper algebraic sign. But if time presses or the telescope is not available, then fair results may be obtained with the B. C. ruler. Thus: Select by eye an object at the same level as the observer for a datum point; then, holding the ruler vertically, use the deflection scale as in measuring horizontal angles.

443. The use of the sliding scale on the ruler may be exemplified as follows:

Example: A position about 200 yards in rear of a crest is contemplated, which will be masked from the opposing artillery and will permit fire on an advanced infantry position which is about 2,000 yards from the guns and has an angle of site of 315.

We have:

$R = 2{,}000$ yards.
$d = 200$ yards.
$s = 15$ mils.

Placing + 15 of the sliding scale opposite range 200 on the ruler, we find opposite range 2,000 the value 63 for h.

The angle of site of the crest is found by the B. C. telescope to be 340; that is, the crest is 40 mils above the position contemplated for the guns. The projectiles will clear the crest by 23 mils.

444. The sliding scale on the ruler also permits us to tell at once the minimum range at which we can fire and still clear the mask. Thus, taking the data of the preceding example, it is quickly determined that the minimum range at which we can fire is 1,300 yards.

445. A convenient method for determining the distance from a mask at which distance the projectiles will clear the mask is as follows:

First. Determine height of mask in yards.

Second. Divide four times this height by the range from mask to target in hundreds of yards.

The result will be the distance, with a large factor of safety, in hundreds of yards from mask to gun so that the trajectory will clear the mask.

If it is desired to limit the dead space to a definite distance, this distance in hundreds of yards should be chosen as the divisor, instead of the range from mask to target.

5. MEASUREMENT OF ANGLES.

446. Angles may be measured in mils by means of the B. C. telescope, the B. C. ruler, or by handbreadths.

The B. C. telescope affords a means of obtaining an accurate measurement of angles. When the telescope is not available, or when time does not admit of its being set up, use may be made of the B. C. ruler or of handbreadths. With practice, measurements sufficiently accurate in the ordinary case may be obtained by either method.

447. In preliminary practice with the ruler or handbreadths the operator should check his results by means of the B. C. telescope, so that he may acquire the habit of holding the ruler or hand at the proper distance from the eye, and, in the case of measurements by hand, of using the proper portions of the hand or fingers. For this purpose a scale of mils may be laid out on any convenient vertical surface by means of the B. C. telescope; the operator then stands at the telescope and holds the ruler or hand so that the graduations of the ruler or the different portions of the hand will just cover the corresponding units of this scale.

448. For measuring by handbreadths each individual will obtain the best results by predetermining, according to the methods just described, the value in mils of certain parts of his hand.

Average values are given below, it being presumed that the hand is held vertically, palm outward, arm fully extended to the front:

	Mils.
Width of first finger at second joint	40
Width of second finger at second joint	40
Width of third finger at second joint	35
Width of little finger at second joint	30
Width of first, second, and third fingers at second joint	115
Width of first, second, third, and little fingers at second joint	150
Width of thumb	40

6. DESIGNATION OF OBJECTIVES.

449. Targets and aiming points must be designated in a concise and unmistakable manner. Officers must exercise themselves in describing objectives of all kinds, in all available forms of terrain, and must accustom those under them to the terms and methods employed in the description. Practice of this character should habitually form a part of firing instruction, and should also be included in the instruction of scouts and agents.

If the targets are distinct and clearly defined, they may be designated by name, as, for example, "The battery on hill 1240," "Cavalry to the right front," etc. But if the target is indistinct and poorly defined, or if it is masked, then each unit may be assigned so many mils of a given front to attack.

450. In designating objectives of any kind (targets, aiming points, registration marks, etc.) the following procedure is appropriate, especially when the objective is not conspicuous nor readily recognized:

Define the ***relative position*** of the objective and its ***characteristics***. The ***relative position*** is fixed by giving the approximate direction and distance of the objective and its situation with respect to prominent features of the landscape. The ***characteristics*** usually important are the nature of the object, its shape and color.

If the objective is in itself inconspicuous, then it is usually best to first designate the most prominent object in its general direction, give the angular distance between this auxiliary objective and the real objective, and then describe the latter as above indicated.

The usual method of procedure is as follows:

1. Indicate the general direction of the objective.
2. Designate the most prominent object in the zone indicated.
3. State the angular distance from this auxiliary object to the objective.
4. Designate the objective.

Thus:

1. To our right front.
2. At 3,000 yards a large stone house, square, two-storied, with a cupola on top.
3. Five hundred mils to the right of the cupola.
4. At 2,500 yards a battery of artillery in position in rear of the large orchard.

Or:

1. To the left rear.
2. At 4,000 yards a line of hills with three plainly marked and well-wooded valleys.
3. Three hundred and fifty mils to the left of the left valley.
4. On the sky line of the hills a lone tree, low and bushy.

Or:

1. Straight to the front.
2. At 3,500 yards a farmhouse in a grove of trees on a ridge.
3. Commencing at 500 mils from the left-hand tree of the grove.
4. Cover 100 mils of the crest line.

451. Targets and aiming points are preferably designated by word of mouth and to a person standing near by. On the occupation of a position the aiming point and the expected targets should, as far as practicable, be thus pointed out to the officer commanding the guns.

452. If it is necessary to send this information to a person at a distance, it is important to remember that objects often present very different appearances if viewed from widely separated positions. For this reason it is desirable to select as aiming points objects having a uniform outline, and hence presenting the same appearance from whatever angle they are viewed. The information is transmitted by couriers or telephone. If a courier is used, he is required to keep the objective in view as much as possible while passing from one station to the other.

453. The designation of objectives may be greatly facilitated by causing a panoramic sketch of the terrain to be prepared and copies to be furnished the different subordinate commanders concerned. On such a sketch important landmarks and military objectives should be named or numbered, so that they may be readily referred to.

7. OBSERVING THE TERRAIN; SECTORS OF OBSERVATION; FORMING THE SHEAF; PREPARATIONS FOR FIRING.

454. In preparation for definite and imminent phases of an action, certain bodies of artillery may be ordered to *observe* the enemy in designated portions of the terrain and be ready to bring him under immediately effective fire.

If possible, the position of the enemy is clearly pointed out; but if his exact position within a certain area has not been determined the area may be divided up into sectors and a sector assigned to each important group of artillery. In the former case the firing data are determined for the known position of the enemy; in the latter case, for prominent features of the terrain within the sector assigned.

With a view to gaining readiness for instant action, the guns may be laid upon the target or upon some selected feature of the terrain and the sheaf formed so as to provide for the desired distribution.

455. To *form the sheaf,* an aiming point is selected, a deflection is given the right piece which will cause it to be directed upon the right section of the target, or upon the registration mark, and a deflection difference is employed which will suffice to distribute the fire over the known or expected front.

If the position of the enemy is known and all necessary data have been obtained, the pieces may be at once loaded.

If the exact position in which the enemy will appear is not known, then on his appearance the necessary corrections in range and direction must be quickly estimated (or measured) and set off. The correction in range is obtained by estimating the target's distance from the selected registration marks; the correction in deflection by measuring, by means of handbreadths or the B. C. ruler, the angle from the registration mark to the section of the target which is to be attacked by the directing piece. The circumstances of the case must decide whether the pieces are to be loaded before the target appears.

456. Trenches should be dug for the trails wide enough to permit them to be shifted through the probable arc of fire.

The safe arc of fire may be taken as 45° on either side of the normal to the battery front, the presumption being that the guns are well aligned. In all cases, however, it is the duty of chiefs of platoon and section to see that their pieces are not fired when pointed at a dangerous angle with respect to other pieces.

457. The initial opening of the sheaf depends upon the nature of the expected target and the circumstances of the action. Thus, if the enemy's artillery is the expected target, a parallel formation of the sheaf may be preferable, while if lines of infantry are to be attacked a more open formation may be appropriate.

If, in order to assist our own infantry, the artillery is called upon to repress the activity of a long line of hostile infantry in position, each battery may be required to act over a wide front. Good judgment and great versatility in the employment of fire are called for under such circumstances, in order that the desired results may be obtained without undue expenditure of ammunition in the earlier phases of the attack. Means may be employed to keep the entire hostile line under the menace of fire, single guns being freely used to repress special activity of the enemy in the sections assigned to such guns.

9. REGISTRATION OF FIRE.

458. Artillery already in position may take advantage of lulls in the progress of an action to register its fire upon positions in which an enemy is known to be or in which he is expected to appear.

459. The purposes of fire for registration are:

(*a*) To determine the firing data for reaching certain prominent features of the terrain, such as crests, plainly marked trees, houses, etc.

(*b*) To discover by actual fire the accidents of the ground which might conceal an enemy or hide the points of burst of our projectiles.

(*c*) To thus gain the ability to open immediately effective fire upon a target appearing at or near these prominent features of the terrain.

460. Registration of fire is especially appropriate for artillery to which definite sectors of observation have been assigned, as the necessary firing data may thus be most readily obtained.

If the position of the enemy within the sector is definitely known—as, for example, that he is behind a certain crest or in the edge of a certain piece of woods—the fire is directed upon some prominent landmark at or near the enemy's position as a registration mark, and the data thus secured in advance for opening prompt and effective fire.

If, however, the enemy's position within the sector has not been located, the artillery commander proceeds in a systematic way to secure the data which will enable him to reach promptly and effectively any part of the sector. He studies the terrain, decides upon the limits in width and depth of the area to be registered, notes the specially prominent features of the terrain with these limits, and by actual firing directed upon these natural features secures the data which will enable him to reach promptly any target appearing in their vicinity.

PART IV.

MOUNTED INSTRUCTION.

CHAPTER I.—THE SOLDIER MOUNTED.

SECTION I.—*Object and sequence of the instruction.*

461. The object of this instruction is the training of the individual recruit:

(*a*) In horsemanship.

(*b*) In the care and management of horses.

(*c*) In saddling and unsaddling; in fitting, cleaning, and caring for all the different articles of the horse equipment.

In order to give greater variety to, and to hasten the instruction of the recruit, his training mounted may with advantage be commenced as soon as he has received elementary instruction dismounted, and the two kinds of training then be carried forward simultaneously.

462. The recruit will be taught that his disposition or temper is usually communicated to and reacts upon the horse, and therefore it is necessary to preserve calmness.

The order of instruction may be modified at the discretion of the officer superintending the instruction, care being taken to develop the confidence of the recruit by progress suited to his capacity, which will exempt him as far as possible from falls and other accidents.

At first the instructor will devote himself chiefly to teaching the recruit the proper seat and carriage on horseback, he will quietly correct faults as they occur and gradually require correct execution of his instructions.

Quiet, well-trained horses will be used in the instruction of recruits.

SECTION II.—*General provisions.*

463. ***Care of horses.***—The recruits must be thoroughly instructed in the rules concerning the care of horses and in grooming, etc. (See Par. VII.)

464. ***Horse equipment.***—The instructor indicates the different articles of the horse equipment, repeats the names, and explains the use of each part.

465. ***Guides.***—When two or more recruits march in line the instructor, as soon as the march is begun, designates the element on one flank or the other as the guide of the movement, thus: ***Guide right (left).***

The other recruits align themselves on the guide thus indicated and maintain their intervals from that flank.

If marching in column of files, or if marching obliquely, the leading element is, without indication, the guide of the movement.

The guide is responsible that the direction and rate of march are properly maintained.

SECTION III.—*The recruit.*

466. ***To stand to horse.***—The recruit places himself, facing to the front, on the near (left) side of his horse, eyes on a line with the front of the horse's head, and takes the position of the soldier, except that the right hand, back uppermost, grasps both reins, forefinger between them, 6 inches from the bit.

The left and right sides of the horse, facing to his front, are called the ***near*** and ***off*** sides, respectively.

467. ***The rests.***—Being at stand to horse, the commands are: ***REST*** and ***AT EASE,*** which are executed as prescribed in The Soldier Dismounted, except that each recruit retains his hold of the reins, to keep his horse in place.

Being mounted, and at a halt, the commands are: ***AT EASE*** and ***REST;*** if marching, ***ROUTE ORDER.*** At the command ***at ease*** the recruit may turn his head and make slight changes of position, but preserves silence.

At the command ***rest,*** or ***route order,*** the recruit may turn his head, may talk and make slight changes of position, but must not lounge on his horse.

To resume the attention, 1. ***Squad,*** 2. ***ATTENTION.*** The recruit, if dismounted, takes the position of stand to horse; if mounted, he takes the position of the soldier mounted.

468. ***To fold the blanket.***—The blanket, after being well shaken, will be folded into six thicknesses, as follows: Hold it well up by two corners, the longer edges vertical; double it lengthwise (so the fold will come between the "U" and "S"), the folded corner in the left hand; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket extended between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds, seize the double folded corner; turn the left (disengaged) corner in, and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds, grasp the corners and shake the blanket well in order to smooth the folds, raise the blanket and hold the upper edge between the chin and breast; slip the hands down halfway, the first two fingers outside, the other fingers and thumb of each hand inside, seize the blanket with the thumbs and first two fingers, let the part under the chin fall forward; hold the blanket up, arms extended, even the lower edges, retake the middle points between the thumbs and forefingers, and flirt the outside part over the right arm; the blanket is thus held before placing it on the horse.

469. *To put on the blanket and surcingle.*—The instructor commands: ***BLANKET.*** Approach the horse on the near side, with the blanket folded and held as just described; place it well forward on his back, by tossing the part of the blanket over the right arm to the off side of the horse, still keeping hold of the middle points; slide the blanket once or twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward; place the blanket with the forefinger of the left hand on the withers, and the forefinger of the right hand on the backbone, the blanket smooth; it should then be well forward with the edges on the left side; remove the locks of mane that may be under it; pass the buckle end of the surcingle over the middle of the blanket, and buckle it on the near side, a little below the edge of the blanket.

470. *To put on the watering bridle.*—***BRIDLE.*** Take the reins in the right hand, the bit in the left; approach the horse on the near side and place the reins over his head letting them rest on his neck; reach under and engage the snap in the off halter ring; insert the left thumb in the side of the horse's mouth above the tush, and press open the lower jaw; insert the bit and engage the snap in the near halter ring. The bit should hang so as to touch, but not draw up, the corners of the mouth.

471. *To take off the watering bridle.*—***UNBRIDLE.*** Remove the reins from the horse's neck, over his head, and disengage the snaps.

472. *To saddle.*—For instruction, the saddle may be placed 4 yards in rear or in front of the horse. The stirrups are crossed over the seat, the right stirrup uppermost; then the cincha and cincha strap are crossed above the stirrups, the strap uppermost. The blanket having been placed as previously explained (par. 469), the instructor commands: ***SADDLE.***

Seize the pommel of the saddle with the left hand and the cantle with the right; approach the horse on the near side from the direction of the croup and place the center of the saddle on the middle of the horse's back, the front ends of the side bars about three finger widths behind the points of the shoulder blades; let down the cincha strap and cincha; pass to the off side, adjust the cincha and straps and see that the blanket is smooth; return to the near side, raise the blanket slightly under the pommel arch so that the withers may not be compressed, take the cincha strap in the right hand, reach under the horse and seize the cincha ring with the left hand, pass the end of the strap through the ring from underneath (from inside to outside), then up through the upper ring from the outside; if necessary, make another fold in the same manner.

The strap is fastened as folows: Pass the end through the upper ring to the front; seize it with the left hand, place the fingers of the right between the outside folds of the strap; pull from the horse with the right hand and take up the slack with the left; cross the strap over the folds, pass the end of it, with the right hand, underneath and through the upper ring back to the folds, then down and under the loop that crosses the folds and draw it tightly; secure the end of the strap.

Another method of fastening the cincha strap is as follows: Pass the end through the upper ring to the rear; seize it with the right hand, place the fingers of the left between the outer folds of the strap; pull from the horse with the left hand and take up the slack with the right; pass the end of the strap underneath and draw it through the upper ring until a loop is formed; double the loose end of the strap and push it through the loop and draw the loop taut. The free end should then be long enough to conveniently seize with the hand.

Having fastened the cincha strap, let down the right stirrup, then the left.

The surcingle, if used, is then buckled over the saddle, and should be a little looser than the cincha.

The cincha when first tied should admit a finger between it and the belly. After exercising for a while the cincha will be found too loose, and should be tightened.

473. Great care must be taken in the fitting and adjustment of saddles, to prevent sore backs.

474. ***To remove the saddle.—UNSADDLE.***

Stand on the near side of the horse; unbuckle and remove the surcingle; cross the left stirrup over the saddle; loosen the cincha strap and let down the cincha; pass to the off side, cross the right stirrup, then the cincha over the saddle; pass to the near side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, and remove the saddle over the croup and place it in front or in rear of the horse as may be directed, pommel to the front; if in the stable, place the saddle on its peg; grasp the blanket at the withers with the left hand and at the loin with the right; remove it in the direction of the croup, the edges falling together, wet side in, and place it across the saddle, folded edge on the pommel.

475. ***To put on the double bridle.—BRIDLE.***

Take the double reins in the right hand, the crownpiece in the left; approach the horse on the near side; slip the reins over his head, letting them rest on his neck; take the crownpiece in the right hand and the lower left branch of the curb bit in the left, the forefinger against the mouthpiece; bring the crownpiece in front of and slightly below its proper position; insert the left thumb into the side of the mouth above the tush; press open the lower jaw, insert both bits by raising the crownpiece, then with the left hand draw the ears gently under the crownpiece, beginning with the left ear; arrange the forelock, secure the throat latch and the curb chain, taking care to adjust them properly.

The bridle with snaffle bit only, used on team horses, is put on in a similar manner.

476. The snaffle bit should touch, but not draw up the corners of the mouth.

The mouthpiece of the curb bit, which should fit the width of the horse's mouth, rests on the bars (the lower jaw between the tushes and molars) opposite the chin groove, 1 inch above the tushes of most horses and 2 inches above the corner teeth of mares.

The curb chain should then lie in the chin groove, without any tendency to ride upon the sharp bones of the lower jaw.

The curb chain should fit smoothly in the groove and be loose enough to admit one or two fingers when the branches of the bit are in line with the cheek straps.

The throat latch should admit four fingers between it and the throat; this prevents pressure on the windpipe or the large blood vessels.

477. At the discretion of the instructor the halter may be taken off before bridling, the reins being first passed over the neck; if the halter is not taken off, the halter strap is tied in the near pommel ring, or, if the horse be not saddled, around his neck.

478. *To lead out.*—The recruits being at stand to horse in the stable or at the picket line, and the horses equipped with snaffle bridles, the instructor indicates the place of formation, and commands: ***LEAD OUT.***

Each recruit, holding his hand well up and firm, leads his horse, without looking at him, to the place designated by the instructor.

The recruits form in single rank from right to left, and, during the elementary instruction, with intervals of 3 yards between horses.

If the horse shows a disposition to resist being led, the recruit takes the reins from the horse's neck, takes the ends in the left hand, then, with the right hand holding the reins, leads the horse as before.

Alignments.

479. The recruits being in line at a halt, and dismounted, the instructor sees that the recruit on the flank toward which the alignment is to be made is in the desired position and commands: 1. *Right (Left),* 2. ***DRESS,*** 3. ***FRONT.*** Executed as in The Soldier Dismounted, except that the left hand is not placed on the hip, and each recruit moves his horse forward or backward, as may be necessary to align him. The instructor may place himself on either flank and give a general alignment by ordering individual recruits to move their horses backward or forward.

To Mount.

480. *With saddle.*—The recruit being at stand to horse: 1. ***Prepare to mount,*** 2. ***MOUNT.***

At the first command drop the right rein; take three steps backward, at the same time sliding the right hand along the left rein; half face to the right; take both reins in the right hand, the forefinger between them, and place the hand on the pommel, the reins entering the hand on the side of the thumb, and so held as to lightly feel the horse's mouth, the bight falling to the off side; place the left foot in the stirrup, assisted by the left hand if necessary; grasp a lock of the mane with the left hand, the lock coming out between the thumb and forefinger.

At the command ***mount,*** holding firmly with the left hand and keeping the right hand on the pommel, spring from the right foot; pass the right leg, knee bent, over the croup of the horse without touching him; sit down in the saddle; insert the right foot in the stirrup, and take one rein in each hand.

Without saddle.—Similarly executed, except that the recruit faces the horse, and the right hand is placed on the back, near the withers. At the command ***mount*** the recruit springs from both feet and supports his weight on his hands, while carrying the right leg over the croup.

481. *To mount from the off side.*—The recruit being on the off side of his horse: 1. ***Prepare to mount,*** 2. ***MOUNT.*** Executed as in par. 480, but by inverse means.

482. If the commands be: 1. ***Squad,*** 2. ***MOUNT,*** the recruit executes at ***mount*** all that has been prescribed for ***prepare to mount*** and ***mount.***

483. *To mount with crossed stirrups.*—The instructor commands: ***CROSS STIRRUPS.***

Throw the right stirrup over to the near side, then the left one to the off side, the straps resting on the withers in front of the pommel, hoods outward.

To mount with stirrups crossed is executed as prescribed for mounting without saddles, the right hand being placed on the pommel instead of on the withers.

Position of the Soldier Mounted.

484. The buttocks should rest evenly in the middle of the saddle and support the weight of the upper part of the body, the legs stretched well down, the knees close to the horse, the lower leg from the knee down hanging naturally and not too close to the horse's side; the toes slightly turned out. The body erect, without stiffness, the head up but free and unconstrained. At fast gaits the chin is slightly drawn in toward the breast. The eyes preserve their mobility so that they will take in the nature of the ground, the neck should be supple, the shoulders down but never contracted; the arms should hang naturally to the elbows, which are kept close to the side and on no account turned outward, the left wrist held slightly below the height of the elbow, hand about vertical, thumb up and back of hand to the left; the right hand when not on the bridle hangs naturally below the right hip; the action of the bit on the mouth to be produced by tightening and slacking of the reins by motion of the fingers and wrist. The back should not be hollowed, the loins are slightly rounded and the chest kept in a natural position. The muscles of the pelvis are slightly relaxed. All semblance of stiffness must be guarded against and the seat be maintained by balance and not by grip, except when occasion demands. The man should sit in the middle of his saddle comfortably as on a chair; the knees will then come to the proper place.

The stirrups are adjusted to the length of the leg, after the seat is established by riding without stirrups, so that when about one-third of the foot is in the stirrup tread the heel is slightly lower than the toe. In schooling horses and for work in the riding hall the stirrup leathers are usually longer than when riding in the open, in order that the legs may be lower and more around the horse.

Remarks.

The body above the hips should be movable, and should in a measure yield to the motions of the horse; from the hips to the knees, immovable and close to the horse; below the knees, movable.

The arms move freely at the shoulders, to avoid communicating the motion of the body to the reins; the hands oscillate slightly with the motion of the horse, but otherwise they are moved only as necessary to direct and control the horse.

A firm, well-balanced seat is essential to a good horseman; the lack of it impedes the horse's actions, and often causes sore backs.

Stirrups.

The stirrups should support the feet and the weight of the legs only, and be of such length that when the legs are in proper position, the feet out of the stirrups, the treads will be about on a level with the lower part of the inner ankle bone.

The length depends somewhat on the formation of the man; a man with a thick, heavy thigh requires a shorter stirrup than a man with a thin, flat one. For long distances at the gallop and trot, a shorter stirrup is required than at the walk.

When riding the stirrups take up, in a measure, the weight of the body in its descent to the saddle, by a yielding of the ankles to prevent shock. This action is an easy, quick stiffening of the muscles, which distributes the downward motion between the feet, thighs, and seat.

Rising to the trot relieves the horse and is authorized at all times except when passing in review.

Holding the Reins.

485. ***In both hands.***—The watering bridle reins are held one in each hand, coming in under the little finger and out over the second joint of the fore finger, on which the thumb presses the rein; fingers clasping the reins, nails toward the body; the reins bearing equally on the horse's mouth, the bight falling to the front on the right side of the neck. The hands are about 6 inches apart, backs vertical and outward.

The double bridle reins are held two in each hand, as explained for the watering bridle, except that the curb rein comes into the hand above the little finger, which separates the two reins, the snaffle rein being outside.

486. ***In one hand.***—The watering bridle reins are held as explained for two hands, except that the right (left) rein comes into the left (right) hand above the little finger, which separates the two reins.

The double bridle reins are held in the left hand, as explained for two hands, except that the two right reins come into the hand, one on each side of the second finger, the snaffle rein uppermost, all four reins being pressed upon the second joint of the fore finger by the thumb.

In the right hand they are so held that there is one rein above each finger, left snaffle rein uppermost; that four reins come out under the little finger, instead of over the fore finger.

487. Whenever the reins are in one hand, the hand in which the reins are held is in front of the middle of the body, the free hand hanging behind the thigh.

To Lengthen or Shorten the Right (Left) Rein.

488. Bring the hands together; grasp the right rein (or reins) with the thumb and fore finger of the left hand a short distance from the right thumb; relax the grasp of the right hand and allow the rein (or reins) to slip through to get the proper bearing; close the right hand, and replace both hands.

To Drop and Retake the Reins.

489. *DROP REINS.*—Drop the reins on the horse's neck near the withers, and place the hands behind the thighs.

TAKE REINS.—The recruit takes up the reins and holds them in both hands, as already explained.

To Take the Reins in One Hand.

490. 1. *In left (right) hand,* 2. *TAKE REINS.*

With the watering bridle.—Bring the left hand opposite the middle of the body, half open the hand, and place in it the right rein, holding the reins as already explained. (Par. 486.)

With the double bridle.—Bring the left hand opposite the middle of the body; turn the right wrist to the left until the back of the hand is up; carry the right hand to the left, and insert the second finger of the left hand between the two right reins; holding the four reins as described for the left hand. (Par. 486.)

To take the double bridle reins in the right hand they are first taken in the left as just described; then turn the left hand *back up,* and insert the extended fingers of the right hand between the reins, so that there is one rein above each finger, holding them as described for the right hand.

To Adjust the Reins.

491. Take the bight with the thumb and fore finger of the right (left) hand; partly open the left (right) hand, and allow the reins to slip through it until they bear equally; close the left (right) hand and allow the bight to fall to the front as described; replace the right (left) hand behind the thigh.

To Retake the Reins in Both Hands.

492. 1. *In both hands,* 2. *TAKE REINS.*

Half open the left (right) hand, seize with the right (left) hand its proper rein and hold both reins as described.

To Dismount.

493. *With saddle.*—1. *Prepare to dismount,* 2. *DISMOUNT.*

At the first command seize the reins in the right hand and place both hands, as described for *prepare to mount* (par. 480). Remove the right foot from the stirrup and partly disengage the left foot, body erect.

At the command *dismount,* rise on the left foot, pass the right leg, knee bent, over the croup of the horse, without touching him; descend lightly to the ground on the ball of the right foot, remove the left foot from the stirrup, and place it beside the right, body erect; place the bight of the reins on the horse's withers with the right hand, which then seizes the left rein; face to the left; step to the front, slipping the hand along the rein and take the position of stand to horse.

Without saddle.—Similarly executed, except that the recruit raises the weight of his body on his hands while carrying the right leg over the croup, and bringing the right foot near the left, descends lightly to the ground on the balls of both feet.

494. *On the off side:* 1. *To the right,* 2. *Prepare to dismount,* 3. *DISMOUNT.*

The second and third commands are executed as in paragraph 493, but by inverse means, the recruit coming to the ground on the off side.

495. To dismount with stirrups crossed is executed as prescribed for dismounting without saddles, the right hand being placed on the pommel instead of on the withers.

496. If the command be: 1. *Squad,* 2. *DISMOUNT;* or, 1. *To the right,* 2. *DISMOUNT,* the recruit executes at the command *dismount* all that has been prescribed at the commands *prepare to dismount* and *dismount.*

To Dismiss the Squad.

497. The squad being in line dismounted: 1. *By the right (left),* 2. *FILE OFF.*

The recruit on the right leads his horse 1 yard to the front and then directly to the stable or picket line. Each of the other recruits, in succession, executes the same movement, so as to follow the horse next on his right at a distance of 1 yard.

If the squad is in column and near the place for removing the equipments, the instructor commands: ***FALL OUT***, at which command each recruit leads his horse directly to his stall or the picket line.

The recruits remove, clean, and put the equipments in place, and care for and secure their horses under the direction of the instructor or senior noncommissioned officer.

Each recruit stands to heel as soon as he has finished. The horses and equipments of all the recruits having been properly cared for and the precautions for the care of horses on their return from exercise having been observed, the recruits are ordered to fall in, are marched to their battery parade, and dismissed as prescribed in The Soldier Dismounted.

498. *Stand to heel.*—Each recruit stands at attention 1 yard in rear of, and facing his heel post. At the picket line he is 1 yard in rear of, and facing his horse.

Mounted Exercises.

499. The mounted exercises make the recruit agile and supple, give him confidence, and enable him to maintain a balanced seat on his horse in every variety of movement. All men will be frequently practiced in them, except those who may be reasonably excused because of age or other inability.

The horses are equipped with the watering bridle, and at the discretion of the instructor, with the blanket and surcingle. If the horse be tied, the blanket should be dispensed with.

When the recruits have been taught, with the horses tied or on the longe, to mount, dismount, and to hold the reins, and when they have some confidence on horseback the exercises are continued with the horses in line, with intervals, or in column of recruits. The instruction in marching and the use of the aids will then begin and thereafter form a part of each lesson.

When the mounted exercises are correctly executed at the halt, they are repeated at the walk; then such as are practicable at the trot, and finally at the canter.

Recruits at first often support themselves with the reins and cling with the legs; to remedy the first of these faults the men are made to ride without holding the reins, the arms folded; the recruits are formed in two parallel columns; each recruit in one column is instructed to pass the reins over his horse's head to the recruit next to him in the other column; the ride is then conducted at the trot.

The same instruction may be given on the longe.

The recruits will not be required to go through all the mounted exercises in the order in which they are described, the more difficult exercises not being attempted and the gaits for the easier ones being restricted to the walk until the recruits have acquired a secure, well-balanced seat at the trot and the gallop.

During the exercises the recruit drops and retakes reins without command whenever necessary to execute the motions or to control his horse, and when he dismounts he remains near the shoulder of the horse and keeps one hand on the withers (or pommel). When the horse is not led, the hand on the withers or pommel holds the reins with a bearing just sufficient to let the horse know he is under control.

To resume the position of stand to horse, the instructor commands: ***STAND TO HORSE.***

The Galloping Step.

500. During the exercises at the trot and canter the recruit when dismounted keeps pace with his horse at the shoulder by means of the galloping step, which he executes (keeping one hand on the horse) by a succession of leaps, rising and alighting with the rise and fall of the forehand of the horse, keeping the left or right foot in advance, according as he is on the left or right side of the horse, and supporting his weight on the balls of the feet. Frequently, brief rests should be given, in order not to strain or unduly fatigue men who are not accustomed to the exercises.

First Mounted Exercise.

501. 1. ***LEAN BACK,*** 2. ***UP.***

Lean back until the head rests on the horse's croup; hands resting on the thighs, toes turned in, legs kept in place. ***Up:*** Resume gradually the position of the soldier mounted without deranging the position of the feet and legs.

Second Mounted Exercise.

1. ***RAISE KNEES,*** 2. ***DOWN.***

Raise the knees until the thighs are horizontal; lower legs vertical; toes on a level with heels and turned in; body erect and shoulders square. ***DOWN:*** Resume the position of the soldier mounted. Continue by repeating ***RAISE, DOWN.***

Third Mounted Exercise.

1. ***RAISE FEET,*** 2. ***DOWN.***

Raise the feet to the rear as high as practicable on the sides of the horse; then raise the knees, keeping the feet in place until on a level with the ankle. ***DOWN:*** Resume the position of the soldier mounted. Continue by repeating ***RAISE, DOWN.***

Fourth Mounted Exercise.

1. ***Right (Left),*** 2. ***REACH.***

Carry the right hand, back up, straight to the front, fingers and arm extended and horizontal. ***(TWO)*** Close the legs firmly, sweep the hand quickly to the right, keeping the arm horizontal and leaning the body to the right. ***(THREE)*** Resume the position of the soldier mounted.

Fifth Mounted Exercise.

1. ***Right (Left) rear,*** 2. ***REACH.***

The first motion is the same as ***right reach.*** ***(TWO)*** Sweep the hand quickly by the right to the rear, keeping the arm horizontal, at the same time making a ***right face*** and leaning the body to the rear. ***(THREE)*** Resume the position of the soldier mounted.

Sixth Mounted Exercise.

1. ***Right (Left) low,*** 2. ***REACH.***

Hold the reins with the thumb and forefinger and grasp a lock of the mane with the other fingers of the left hand. ***(TWO)*** Bend the body to the front and downward, to the right of and near the horse; right arm extended and fingers as near the ground as possible. ***(THREE)*** Resume the position of the soldier mounted.

The horse being saddled: 1. ***Right (left) low,*** 2. ***REACH.***

Hold the reins with the thumb and forefinger and grasp a lock of the mane with the other fingers of the left hand; free the left foot from the stirrup and carry the leg, knee bent, to the rear, supporting it just above the ankle against the cantle of the saddle. ***(TWO)*** Bend the body to the right and front and near the horse; carry the right foot in the stirrup slightly to the rear, supporting it against the side of the horse; extend the right arm and touch the ground with the fingers. ***(THREE)*** Resume the position of the soldier mounted.

Seventh Mounted Exercise.

Without saddle: ***Turn to the right (or left) about.***

Place both hands on the withers; raise the body upward and forward on the hands; at the same time quickly extend the legs to the rear and cross them, left leg in front, above the horse's back; lower the body, catching the horse on the left side with the right leg and the right side with the left leg; at the same time give an impulse to the right with the hands; sit down facing the croup.

The recruit facing to the croup, to face him to the proper front the instructor gives the same commands, which are executed in a similar manner.

It is preferable for the recruits to go through this exercise by individual trial, until they have gained confidence, before requiring them to execute it at command.

Eighth Mounted Exercise.

To mount, marching: 1. ***Prepare to mount,*** 2. ***MOUNT.*** Executed as prescribed from the halt, except that the recruit is at the galloping step; that he springs forward as he rises, and that as he drops into his seat he catches against the flank with his leg to avoid passing over the horse.

Ninth Mounted Exercise.

To dismount, marching: 1. ***Prepare to dismount,*** 2. ***DISMOUNT;*** or 1. ***To the right,*** 2. ***Prepare to dismount,*** 3. ***DISMOUNT.*** Executed as prescribed from the halt, except that when the legs are joined, the recruit presses the left leg against the side of the horse to push his body clear, and alights on the ground faced to the front and takes the galloping step.

Tenth Mounted Exercise.

Being at the halt: 1. ***Prepare to vault,*** 2. ***VAULT.*** Executed from either side of the horse, as prescribed for the mount from the halt, except that the recruit leans the body forward and carries both legs joined over the horse's back, without touching it. As soon as the body clears the horse he eases the right hand gradually and takes it off the withers (pommel) just before coming to the ground, and alights on both feet.

Being in march, the recruit alights facing to the front, and takes the galloping step.

When the recruit is sufficiently instructed, the instructor may combine the mounting, dismounting, and vaulting. For example: Mounted, the instructor commands: ***DISMOUNT AND MOUNT,*** or, ***DISMOUNT, VAULT, AND MOUNT,*** etc.

Eleventh Mounted Exercise.

To mount double and to dismount.—The recruits are divided into two squads, the first squad being mounted, and the recruits called individually No. 1; the other squad being dismounted, and its recruits called individually No. 2.

Nos. 1 remain with their horses and Nos. 2 are ordered to join Nos. 1; or, if in the riding hall, the first squad is put on the track in column of recruits marching to the left hand, and the second squad ordered to join it. No. 2 places himself on the near side and near No. 1, and may place his right hand on the horse's back.

1. ***Prepare to mount,*** 2. ***MOUNT.***

At the first command, No. 1 takes the reins in the right hand, lowers the left shoulder and carries the left elbow, bent, to the rear, and supports himself by clasping the horse with the legs, and, if necessary, places his right hand on the horse's neck or withers; No. 2 clasps the forearm of No. 1 with his left hand, back up; places his right hand on the horse's back directly behind No. 1, and, if marching, takes the galloping step.

At the command ***mount,*** No. 2 springs up and seats himself behind No. 1, astride of the horse and facing to the front; No. 1 at the same time raises his left shoulder, leans his body to the right to assist and support No. 2, and immediately resumes the erect position; No. 2 steadies his seat by placing his hands under the armpits of No. 1, thumbs behind the shoulders.

Being Mounted Double, to Dismount.

1. *Prepare to dismount,* 2. *DISMOUNT.*

At the first command, No. 1 takes the reins in the right hand, carries his left elbow to the rear and steadies himself as at the command *prepare to mount* for mounting double; No. 2, pressing against No. 1, pushes himself slightly to the rear, and places his right hand on the horse's back between himself and No. 1, and his left hand, back up, on the left forearm of No. 1. At the command *dismount,* No. 2 carries the right leg over the croup, comes to the ground and takes the galloping step, supporting himself by his hands, without hanging on No. 1.

If the command be: *No. 1, prepare to dismount,* 2. *DISMOUNT.* No. 1 drops the reins, places his left hand on the left thigh of No. 2, and grasps a lock of the mane with the right hand. At the command *dismount,* No. 1 passes the right leg over the horse's neck, raising the right hand and reseizing the mane as the leg passes, springs from the horse, pushing himself forward with the left hand, and supporting himself with the right, comes to the ground and takes the galloping step. No. 2 then takes the reins and seats himself forward; No. 1 retains his hold of the mane until he can safely do without it, and then takes position as No. 2 alongside of the mounted recruit now become No. 1.

If the commands be: 1. *Squad,* 2. *DISMOUNT* (both recruits being mounted), No. 2 dismounts, then No. 1 in front of No. 2.

At the command: 1. *Squad,* 2. *MOUNT* (both recruits being dismounted), No. 1 mounts and then No. 2, as previously explained.

If, when the squad is dismounted, the instructor wishes No. 1 to become No. 2, and No. 2 to become No. 1, he commands: *CHANGE NUMBERS,* when the recruits take places according to their new numbers.

These exercises are executed on both sides of the horse and at all gaits.

The Aids.

502. The reins and legs, the application of which determines the movements and gaits of the horse, are called the aids.

The recruit should not only know when to apply a given aid, but he should also understand why it should be applied.

Great care should be constantly exercised in the combined application of the aids, that they may not oppose each other in their action, i. e., one favoring the intended move, the other opposing it.

The reins serve to prepare the horse to move, and to guide, support, and halt him; their action should be gradual and in harmony with the legs.

In using the reins, the arms should have free action at the shoulder; when a light pressure will serve to govern the horse, the action should be at the wrist; for greater pressure the elbow should be carried back, but without raising the hand.

In riding, the bridle hand should not move with the body, but it should oscillate with the motion of the horse's head; at the same time it should be kept light, for the bit causes pain if pressed constantly on the mouth, and makes the mouth hard by destroying its sensibility.

The hand is light when there is an almost imperceptible alternate feeling and easing of the bit, in harmony with the motion of the horse, by which the delicacy of the mouth is preserved, and the horse made to carry himself lightly.

That hand is best, and will best preserve the mouth, which, by easing and feeling properly, so as to keep in constant touch with the bit, controls the horse with the least force.

The legs serve to assist, together with the reins, in controlling the horse. Closing the knees without pressure by the lower part of the legs tends to steady the horse in position. Carrying the lower legs slightly to the rear, at the same time closing them equally with light pressure, prepares him to move, or, if moving, keeps him up to the hand. Closing them with greater pressure behind the girth urges him forward.

Carrying the right (left) leg to the rear, closing it with pressure, causes the horse to move his haunches to the left (right).

The pressure of the legs must be an elastic muscular action, suited to the sensitiveness of the horse; a heavy, clinging pressure or a thumping with the heels must not be permitted.

The reins act to govern the forehand; the lower legs incite to action and govern the movement of the haunches.

All changes of gaits should be gradual. The horse should never be spurred to make a sudden start, nor should the reins be jerked.

The Spur.

503. The spur is used as an aid, also as a means of punishment.

It is used as an aid to augment the effect produced by one or both legs; as a punishment, when the horse refuses to obey the action of the legs.

To use it as an aid, continue the pressure of the leg until the spur touches the skin and adds its effect to that of the leg.

To use it as a punishment, hold firmly with the legs, turn the toes out a little, yield the hand slightly, and press firmly with the spur behind the girth without moving the body, until the horse obeys. The spur must never be used to punish unless absolutely necessary, and then with vigor at the moment the horse commits the fault. Unnecessary strokes will arouse his resentment, and induce stubbornness; a thumping or a continuous light touch will either make the horse insensible to the proper action of the legs or cause him to kick.

504. A horse is ***bit wise*** when, the bit being correctly fitted and properly adjusted (par. 476), he obeys the lightest pressure on either bar.

He is ***rein wise*** when he obeys the lightest pressure of the rein on either side of the neck, the bit not being disturbed from its normal position.

He is ***leg wise*** when he obeys the lightest correctly applied action of the rider's legs.

505. ***To gather the horse.***—Close the legs gently, and at the same time apply a light pressure on the bit by turning the little finger toward the body; this attracts the attention of the horse and prepares him to move, so that his first motions may be neither too abrupt nor too slow.

To March.

506. 1. ***Forward,*** 2. ***MARCH.***

Gather the horse; rein in slightly, then yield the hand and close the legs slightly to the rear, with firm, equal, elastic pressure, until the horse responds; then relax the legs, and adjust the reins so as to lightly feel the bit.

To Halt.

507. 1. ***Squad,*** 2. ***HALT.***

Gather the horse without checking him; rein in gradually by bringing the hands toward the body, turning them on the wrists, and carrying the elbows slightly to the rear without raising the hands; close the knees to steady the horse. When the horse stops, relax the hands and knees.

To March by the Flank.

508. *By the right (left) flank,* 2. ***MARCH.***

Gather the horse; open the right rein and close both legs, the right a little more to the rear than the left; wheel the horse to the right over a quarter circle whose radius is 2 yards; when the wheel is nearly ended reduce the effect of the right rein and leg, using the left rein and leg to straighten the horse; when the wheel is completed relax both legs and move to the front in the new direction.

If this movement be executed from line with intervals, the recruits are in column of files with the distance of 4 feet from the head of one horse to the croup of the horse next in front; each recruit conducts his horse so that the man who immediately precedes him will hide all the other men in front.

If it be executed from column of files, the recruits are in line with intervals.

509. The wheel for the individual recruit is a movement over an arc of 90°, with a radius of 2 yards.

To March to the Rear.

510. 1. *Right (left) about,* 2. ***MARCH.***

Executed as explained for the march by the flank, except that each recruit moves his horse over a half circle, instead of a quarter circle.

If executed at a trot or a gallop, the radius is slightly increased and the gait moderated.

To March Obliquely.

511. 1. *Right (left) oblique,* 2. ***MARCH.***

Executed as explained for the march by the flank, except that each recruit moves his horse over an eighth of a circle instead of a quarter circle. During the oblique march the recruits maintain their relative positions with respect to each other, so that on executing a second oblique they will be in line or in column, as the case may be, with proper intervals or distances.

To Change Direction in Column of Files.

512. 1. *Column right (left),* 2. ***MARCH.***

The leading recruit marches by the flank; the other recruits march squarely up to the wheeling point and execute the change of direction successively on the same ground.

Column half right (half left) is similarly executed, the change in direction being 45° instead of 90°.

To Rein Back.

513. 1. *Backward,* 2. ***MARCH,*** 3. *Squad,* 4. ***HALT.***

Gather the horse, holding the legs close; rein in gradually until the horse yields to the bit pressure and steps to the rear; then yield the hand slightly, to allow the horse to regain his balance, and relax the legs; continue alternately to yield the hands, relaxing the legs, and to rein in, closing the legs, so as to keep the horse in continuous motion.

This command is used only for the purpose of moving the horse a few steps to the rear.

The movement should be frequently practiced to keep the horse light and collected.

If the horse raises his nose and throws his weight on his haunches without stepping back, hold the hands low and play the reins with light, rapid motions of the hands until he yields.

If the horse throws his haunches to the right, ease the left leg and close well the right. If to the left, ease the right leg and close well the left. If this be not sufficient to put the horse in proper position, open the rein on the side toward which he throws his haunches, supporting him at the same time with the other rein.

Backward movements should terminate with two or three steps to the front.

To March by the Flank in Column of Files from Line without Intervals.

514. 1. *By file by the right (left) flank,* 2. ***MARCH.***

The recruit on the right marches by the right flank; each of the others successively executes the movement in time to follow the man next on his right at a distance of 4 feet from head to croup.

If marching, all halt at the command march, except the man on the right. The movement is then executed as from a halt.

To Form Line without Intervals to a Flank, from Column of Files.

515. 1. *Right (left) into line,* 2. *MARÇH,* 3. *Squad,* 4. *HALT.*

The leading recruit marches by the right flank; all the others continue straight forward, and each successively wheels to the right when 1 yard in rear of the point where the recruit preceding him began his wheel. The leading recruit halts at the command, each of the others halts when on the line with the leading recruit, and to his right. The command *halt* is not given until the leading recruit has advanced 5 yards in the new direction.

The Riding School.

516. If there be no riding hall, a rectangular track is laid out, 100 yards long and 33 yards wide. The corners are marked with stakes or stones, and the recruits are required to keep within the prescribed limits.

Spent oak tan makes an excellent covering, and when used should be spread on a track of 6 to 10 feet in width. For the mounted exercises it is advantageous to have the track inclosed. The fence should incline outward, 4 on 1, to form the knee guard.

A convenient number of recruits, about 12 to 16, will be united for instruction in the school. The horses should be equipped with the snaffle bit, and at the discretion of the instructor may be saddled.

The leading and rear files, designated conductors, should be noncommissioned officers or instructed privates.

The march is said to be to the right hand or to the left hand, according as the right or left hand is toward the interior of the track.

The instructor, placing himself inside the track, gives his attention to individual horsemanship rather than to accuracy of drill.

The recruits may be divided into two squads. The instructor designates the rear recruit of the first squad and the following recruit of the second squad as conductors. The squads are separated by halting the second or causing the first to take an increased gait. When the leading conductors are at corresponding points on opposite sides of the track, the second squad takes up the march or the increased gait and maintains its distance.

To Change Hands.

517. The instructor commands: 1. ***Column right (left),*** 2. ***MARCH,*** when the conductor is marching on one of the sides, and 3. ***Column left (right),*** 4. ***MARCH,*** when he arrives within 2 yards of the opposite side.

Or, 1. ***Column half right (half left),*** 2. ***MARCH,*** when the conductor enters one of the long sides; and 3. ***Column half left (half right),*** 4. ***MARCH,*** when near the opposite side.

Or, as soon as the last man is upon one of the long sides, 1. ***Right (left) oblique,*** 2. ***MARCH,*** adding, 3. ***Left (right) oblique,*** 4. ***MARCH,*** when the squad arrives near the opposite side, Or, 1. ***By the right (left) flank,*** 2. ***MARCH,*** when the column is marching on one of the long sides, and 3. ***By the left (right) flank,*** 4. ***MARCH,*** when the line arrives within 2 yards of the opposite side.

When marching in line each recruit regulates his horse by that of the conductor who last led in column.

In changing hands in column, when the recruits have been divided into two squads, the columns pass each other to the right; in changing hands in line, the recruits pass each other to the right, and keep their legs closed while passing through the intervals to prevent the horses from slackening the gait.

To Trot.

518. 1. ***Trot*** (or ***Slow trot),*** 2. ***MARCH.***

Gather the horse; yield the hands slightly and close the legs by degrees until the horse obeys, then replace the hands gradually and relax the legs.

The gait is slow at first, and the instructor sees that the recruits feel lightly their horses' mouths without bearing upon the reins, and explains that the necessary ease and stability are acquired by sitting well down on the horse, or saddle, and partially relaxing the body, thighs, and legs, the hands oscillating with the motion of the horse's head.

The recruits are required to preserve their seats by balancing the body; to avoid the fault of leaning too far forward, or curving the back to the rear; to sit erect and keep the thighs close to the horse.

To Take the Walk from the Trot (or Slow Trot).

519. 1. ***Walk,*** 2. ***MARCH.***

Gather the horse; rein in by degrees, and hold the legs close to prevent the horse from coming to the halt; as soon as he walks, replace the hands gradually and relax the legs.

To Take the Trot from the Slow Trot, and the Reverse.

520. 1. ***Trot,*** 2. ***MARCH.***

Executed as in paragraph 518.

The instructor sees that the horses are kept up to the proper gait, and pays particular attention to the position of the recruits; if their seats become too much deranged, he brings the squad to the slow trot, or to the walk; this is especially important in the earlier instruction of the recruits.

To resume the slow trot: 1. ***Slow trot,*** 2. ***MARCH.***

Rein in by degrees, until the horse moderates the gait, closing the legs to prevent his taking the walk.

To Halt from the Trot (or Slow Trot).

521. 1. ***Squad,*** 2. ***HALT.***

Executed as explained from the walk (par. 507), the recruits being careful not to stop the horses too abruptly.

To Pass from the Front to the Rear of the Column.

522. Being at the walk, to teach recruits the application of the aids: 1. ***First file front to rear,*** 2. ***MARCH,*** 3. ***NEXT.***

The leading recruit gathers his horse, leaves the column by the right or left about, according as he is marching to the right or left hand, moves parallel to the column, and enters it again at the rear by another about.

The other recruits in succession execute the same movement at the command ***next,*** which is repeated by the instructor until all the recruits have passed from front to rear.

To Pass from the Rear to the Front of the Column.

523. Being at the walk: 1. ***Last file rear to front,*** 2. ***Trot,*** 3. ***MARCH,*** 4. ***NEXT.***

The recruit in rear gathers his horse, leaves the column by an oblique, takes the trot, moves parallel to the column, enters it again at the front by another oblique, and resumes the walk, and so on for the others, each moving out at the command ***next.***

Should the recruit enter the column at too great a distance in front of the leading recruit, he slackens the walk until at the proper distance.

To March in Circle.

524. Marching to the right (left), the conductor being at least 17 yards from a corner: 1. ***Squad,*** 2. ***Circle right (left),*** 3. ***MARCH.***

The leading conductor gathers his horse and describes a circle between the two tracks; the other men follow, each gathering his horse before entering upon the circle, keeping him there by the inner rein, and closing the legs.

525. While circling, the squad may change gaits, be halted in column, and put in march, as when marching on the track.

To change hands: 1. ***Column right (left),*** 2. ***MARCH.***

The squad passes over the diameter of the circle and circles in the opposite direction by the commands: 3. ***Column left (right),*** 4. ***MARCH,*** the command ***march*** being given when the conductor is 2 yards from the circumference.

To march again on a straight line, the instructor commands: 1. ***Forward,*** 2. ***MARCH,*** when the leading conductor arrives on the long side of the track.

The conductor, followed by the other recruits, then takes the track and moves forward.

The Spiral.

526. Marching to the right, and at least 17 yards from a corner: 1. ***Spiral right,*** 2. ***MARCH.***

The conductor, followed by the other recruits, gradually diminishes the circle until the column is riding inward on a spiral. On approaching the center: 1. ***Column left about,*** 2. ***MARCH.***

The conductor turns left about and rides outward on a spiral and resumes the track, marching to the left.

Spiral left is executed in a similar manner.

Individual Circling.

527. Marching to the right (left) hand on a long side of the hall: 1. ***Files, circle right (left),*** 2. ***MARCH.***

Each recruit marches on a circle 4 yards in diameter, tangent to the track, regulating on the conductor, all completing the circle at the same time. The recruits continue on the circle until the commands: 1. ***Forward,*** 2. ***MARCH,*** given as the recruits take the track; they then march on the track to the same hand as when the movement began.

When marching on the circle to the right, each recruit opens the right rein and closes both legs; when marching at the trot or the gallop, he closes the left more than the right, to sustain the horse. If the commands: 1. ***Squad,*** 2. ***HALT,*** be given, the recruits halt their horses facing in the same direction as the conductors.

The Double Bridle.

528. When the recruit is sufficiently instructed, so that he rides fairly well and has confidence in his seat, using the snaffle bridle and either the blanket or the saddle, the instruction is continued, using the double bridle, both with and without the saddle.

The general principles for the use of the reins and legs, explained for the snaffle bridle, apply to the management of the horse with the double bridle. The curb bit of this bridle being much more severe than the snaffle, in using it force must be applied gradually and more gently, particularly in halting and reining back.

To turn the horse to the right (left) when the reins are held in one hand, carry the bridle hand slightly forward and to the right (left), so that the left (right) reins bear lightly against the side of the neck.

The Gallop.

529. In galloping, a horse leads with the right foot when the right fore and hind legs move in advance of the left legs, and vice versa. He gallops true when he leads with the right foot in marching to the right hand; he gallops false if, when marching to the right hand, he leads with the left foot, and conversely.

A horse is disunited when he leads with the left (right) fore foot followed by the right (left) hind foot, in which case his balance is deranged and the rider is conscious of irregularity of movement. When galloping true, the horse preserves his balance, has his legs under control, and can easily recover himself in case of a mistake; when galloping false or disunited, he is more liable to fall if he blunders.

The canter is a short, collected gallop.

To Take the Gallop or Canter from the Walk or Trot.

530. 1. *Gallop* (or, 1. *Canter),* 2. ***MARCH.***

Gather the horse; close both legs and rein in with a firm, light hand (this to bring the haunches under); as soon as the horse rises, give the hand and relax the legs; reining in slightly and closing the legs with light pressure will keep the horse at the gait and up to the hand; a dead pull should be avoided; if the horse bears on the bit, yield the hand and play the reins a little, then close the legs and rein in abruptly; as soon as the horse obeys, yield the hand.

At first the gait is restricted to the canter and each recruit allowed to accommodate himself to the motion of the horse without losing his seat.

To keep the horse true, the rider must accommodate himself to all the horse's motions, particularly in changing direction. When a horse gallops false or disunited, his rider is ordered to leave the column, take the trot, and pass to the rear of the column; as he enters the column at the rear he resumes the gallop, starting his horse true.

To Take the Gallop from the Canter, and the Reverse.

531. 1. *Gallop,* 2. ***MARCH.***

Give the hand and close the legs by degrees until the horse increases his gait to the gallop; when the proper gait is attained, replace the hand and relax the legs.

Particular attention is paid to the positions of the recruits; if their seats become deranged, the gait is reduced to the canter or the trot.

To resume the canter: 1. *Canter,* 2. ***MARCH.*** Rein in by degrees until the horse takes the canter, closing the legs to prevent his taking the trot.

To Take the Trot from the Gallop or Canter.

532. 1. ***Trot,*** 2. ***MARCH.***

Gather the horse, rein in by degrees, and hold the legs close; as soon as the horse trots replace the hand gradually and relax the legs.

533. The object of the passages and circling on the forehand and haunches is to teach the horse to obey the pressure of the legs and reins, and to instruct the recruits in the application of the aids.

Each of these movements will first be taught to the recruits individually. If the movement be new to the horses, the recruit should have one or two light, pliant switches sufficiently long to reach the horse behind the girth, which are used at the time of and on the same side as the pressure of the leg; when the horse yields much should be made of him; it will encourage the horse to pet him after each effort.

Care is taken that the movements are not hurried, nor too much required of the horse during the first trials.

To Turn on Forehand and Haunches.

534. To turn the horse on his forehand: 1. ***On forehand,*** 2. ***To the right (left);*** or, 2. ***To the right (left) about,*** 3. ***MARCH.***

Gather the horse; close the right leg behind the girth until the horse steps to the left with his hind feet, keeping him straight and preventing him from stepping off with his fore feet by supporting him with the left leg and the reins; relieve the pressure of the right leg as soon as the horse obeys. Continue the application of these means until the horse has turned to the required degree; the fore feet should remain in place. If the horse does not obey the pressure of the legs at first, open slightly the right rein.

If the horse steps his fore feet to the right, increase the effect of the left rein to keep them in place.

535. To turn the horse on his haunches, the instructor places the squad on the track facing the wall and commands: 1. ***On haunches,*** 2. ***To the right (left);*** or, 2. ***To the right (left) about,*** 3. ***MARCH.***

Rein in to throw the weight on the haunches, and close the legs to prevent him from backing; then carry the bridle hand slightly forward and to the right, pressing the left rein on the horse's neck, without disturbing the normal pressure of the bit, to make him step with his fore feet to the right; at the same time support him with both legs, the left leg well behind the girth to keep the haunches approximately in place.

To Passage.

536. Being upon a long side, the squad is marched by the flank and halted, head to the wall or track, upon arriving near the opposite side. The instructor then commands: 1. ***Right (left) pass***, 2. ***MARCH***, 3. ***Squad***, 4. ***HALT***.

Gather the horse and incline him to the right by carrying the bridle hand slightly to the right; rein in, close the legs, to force the horse to the bit; bear the hand well to the right, the left rein pressing the horse's neck, and close the left leg behind the girth, keeping the body erect. Continue the movement by a gentle application of the same means.

The horse's shoulder should precede the haunches; that is, he is held inclined to the right. Only a few steps should be taken at first.

At the command ***halt***, replace the bridle hand; relax the pressure of the left leg as soon as the horse moves his haunches and is straight in line.

The application of the reins and legs should be in harmony with the sensibility of the horse; if the horse obliques too much, diminish the bearing of the reins; if he steps too quickly, moderate the effect of reins and legs; if he backs, force him up to the bit by pressure of the legs.

The passage in column may be executed by the application of the same means. The movement will be practiced at the trot and canter.

Gaits of Horses.

537. The maneuvering walk is at the rate of 4 miles an hour.

The maneuvering trot is at the rate of 8 miles an hour.

The maneuvering gallop is at the rate of 12 miles an hour.

The slow trot is at the rate of from 6 to 6½ miles per hour.

The canter is at the rate of 8 miles an hour, the same as the trot.

When the recruits ride well they will be instructed in the rate of the maneuvering gaits. For this purpose stakes are placed in a straight line and 117⅓ yards apart. The recruits are required to march over the spaces at the rate of one, two, or three per minute, according as the gait is the walk, trot, or gallop.

Noncommissioned officers, drivers, and cannoneers when mounted, should also occasionally receive the above instruction in order that the maneuvering gaits may always be executed at the regulation rate.

538. All field artillery recruits receive the foregoing training in The Soldier Mounted.

CHAPTER II.—THE GUN SQUAD MOUNTED.

539. The special instruction required for the cannoneers of a battery of horse artillery embraces that of a gun squad mounted and that of two or more gun squads mounted.

Composition of the Gun Squad.

540. A *gun squad* is ordinarily composed of two corporals and not less than seven privates, two of the latter acting as horse holders for the cannoneers' horses.

541. A *caisson squad* consists ordinarily of two corporals and such number of cannoneers as may be assigned. Instructions prescribed for the gun squad apply, with obvious modifications, to the caisson squad, the senior caisson corporal performing, as far as applicable, the duties prescribed for the gunner.

Formation of the Gun Squad.

542. The gun and caisson squads are formed as prescribed in paragraphs 186 and 187, with an interval of 6 inches from knee to knee and a distance of 1 yard from the croups of the front-rank horses to the heads of the rear-rank horses.

543. In the gun squad Nos. 6 and 7, and in the caisson squad the two Nos. 7, act as horse holders. If there are less than six cannoneers in the squad, the highest numbered cannoneer acts as horse holder, the horses being linked in single rank.

544. The guides of the squad are the gunner and the caisson corporal.

To Form the Gun Squad.

545. The instructor indicates the point where the right of the squad is to be and the direction in which it is to face and commands: ***LEAD OUT.***

The gunner repeats the command and places himself where the right of the squad is to rest, faced in the proper direction.

The men lead out and form in double rank, taking the position of stand to horse, with intervals of 18 inches between horses; each rear-rank man places his horse at the distance of 1 yard from the croup of the horse of his front-rank man, the horses covering each other.

To Mount.

546. 1. ***Cannoneers prepare to mount,*** 2. ***MOUNT.***

Executed as explained in The Soldier Mounted, the cannoneers mounting without moving their horses out of ranks; if necessary, they make them give way slightly to the right or left.

If the command be: 1. ***Cannoneers,*** 2. ***MOUNT,*** the cannoneers execute at the command ***mount*** all that has been prescribed for the commands ***prepare to mount*** and ***mount.***

To Dismount.

547. 1. ***Cannoneers prepare to dismount,*** 2. ***DISMOUNT.***

Executed as explained in The Soldier Mounted, the cannoneers dismounting without moving their horses out of ranks; if necessary, they make them give way slightly to the right or left.

If the command be: 1. ***Cannoneers,*** 2. ***DISMOUNT,*** they execute, at the command ***dismount,*** all that has been prescribed for the commands ***prepare to dismount*** and ***dismount.***

Alignments.

548. The alignments are first taught by requiring the cannoneers to align themselves upon two files established as a base.

The squad being in line at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few paces, and establishes them as a base; he then commands: 1. ***By file,*** 2. ***Right (Left),*** 3. ***DRESS,*** 4. ***FRONT.***

At the second command each man of the file on the right gathers his horse, and at the command *dress* moves forward; when near the line each man slackens the gait, moves up slowly, casts his eyes to the right so as to see the buttons on the breast of the second man from him, sits squarely on his horse, keeps his horse straight in ranks, and touches lightly with his stirrup the stirrup of the man on his right. The other men dress in the same manner, each moving off when the preceding man halts.

The instructor verifies the alignment and gives the command *front* when the last man is aligned, at which command all cast their eyes to the front. All movement in the ranks must then cease.

The instructor observes in the alignment: That each man gathers his horse at the proper time; that he moves his horse steadily and keeps him square to the front; that he sits squarely on his horse and dresses promptly as he arrives on the line; that he does not lean his head or body to the front or rear; that he keeps the interval of six inches from knee to knee, touching lightly the stirrup of the man on his right; that he relaxes the reins and legs as soon as he has dressed.

549. In the first drills the basis of the alignment is established parallel to the front of the squad, and afterwards in oblique directions.

550. The cannoneers having learned to align themselves man by man, the instructor establishes the basis of alignment as before and aligns the squads by the commands: 1. ***Right (Left)***, 2. ***DRESS***, 3. ***FRONT***.

At the command *dress*, all the men, except the base files, move forward and dress up to the line.

551. Alignment to the rear is executed on the same principles; the instructor commands: 1. ***Right (Left) backward***, 2. ***DRESS***, 3. ***FRONT***.

All the men, except the base files, rein back, keeping their horses straight, halt in line with, or a little in rear of the base, and immediately dress up to the line.

The Rests.

552. Executed as prescribed in The Soldier Mounted. To resume attention, the commands are: 1. ***Squad***, 2. ***ATTENTION***.

To File Off.

553. Each front rank man executes the movement as explained in The Soldier Mounted; each rear-rank man moves forward with his front-rank man, changes direction to the right or left at the same time with him, and then marches abreast of him.

To Dismiss the Squad.

554. Executed as prescribed in The Soldier Mounted.

To March in Line.

555. Being in line at the halt: 1. *Forward,* 2. ***MARCH.***

The squad moves off promptly, the guide marching straight to the front at the regular gait.

The instructor observes that the squad marches straight to the front at the regular gait; that the men keep their horses straight in ranks; that they maintain the proper interval from the side of the guide; that they yield to pressure from that side and resist pressure from the opposite direction; that, if too much closed toward the guide, they carry the bridle hand from that side and close the knee on the side of the guide; that, if the interval be too great, they carry the bridle hand toward the guide and close the leg on the opposite side; that, while habitually keeping the head to the front, they occasionally glance toward the guide; that if in advance they rein in gradually; that if in rear they gradually increase the gait until the alignment is regained.

The instructor will impress upon the men that the alignment and interval can be preserved only by uniformity of gait and by keeping the horses straight in the line of direction. The interval when lost should be regained as much through the pressure of the legs as by the use of the reins.

To call attention to the loss of alignment or interval, the instructor commands: ***DRESS.*** At this command the men glance toward the guide and then make the necessary correction.

556. Marching in line, to effect a slight change of direction: *Incline to the right (left).*

The guide turns his horse slightly to the right and marches in the new direction; the other men gradually conform to the movements of the guide, increasing or diminishing the gait according as the change is toward or opposite the side of the guide.

To Halt.

557. 1. *Squad,* 2. ***HALT.***

To Rein Back the Squad.

558. Being in line at a halt: 1. *Backward,* 2. ***MARCH.***

All the men rein back, dressing on the guide.

This movement is used for short distances only.

To Oblique in Line.

559. 1. *Right (Left) oblique,* 2. ***MARCH.***

At the command march each man executes a half wheel to the right, his right knee in rear of the left knee of the man on his right. The squad moves in the new direction, regulating by the right, in a line parallel to the original front.

If the command *halt* be given while marching obliquely, the men halt faced in the direction in which they were marching.

To resume the oblique march: 1. *Forward,* 2. ***MARCH.***

While obliquing, to resume the march in line: 1. *Left (Right) oblique,* 2. ***MARCH.***

To Turn and Halt.

560. Being in line: 1. *Squad right (left),* 2. ***MARCH,*** 3. ***FRONT.***

At the command *march,* the front-rank man on the right wheels his horse to the right and halts; each of the other men turns his horse to the right, approximating the oblique and moving by the shortest line without changing the speed, places himself abreast of the pivot man. The rear-rank men conform to the movement of the front rank and place themselves, covering their file leaders at a distance of 1 yard. All dress to the pivot without command.

The instructor verifies the alignment from the pivot.

Squad half right (half left) is executed in the same manner; the pivot makes a half wheel to the right.

To Turn and Advance.

561. Being in line at the halt or at the walk: 1. *Right (Left) turn,* 2. ***MARCH.***

The front-rank man on the right wheels his horse to the right and moves forward in the new direction without increasing the speed; each of the other men turns his horse to the right, approximating the oblique, and, moving at the trot by the shortest line, places himself abreast of the pivot man, when he takes the gait and direction of the latter. The rear-rank men conform to the movements of the front rank and place themselves, covering their file leaders at a distance of 1 yard. During the turn the guide is, without command, on the pivot flank; the guide is announced when all the men have arrived on the line.

If marching at the trot, the pivot man continues at the trot; all the others move at the gallop.

If marching at the gallop, the pivot takes the canter; all the other men continue the gallop, each taking the canter on arriving in line; as soon as the men have arrived on the line the instructor commands: 1. *Gallop,* 2. *MARCH.*

Right (Left) half turn is executed on the same principles; the pivot man makes a half wheel to the right.

The About by Squad.

562. Being in line: 1. *Squad right (left) about,* 2. *MARCH.*

Executed as prescribed in paragraph 560, except that the front-rank pivot man describes a half circle and then moves off in the new direction. The guide is announced, or the squad halted, as soon as the front-rank man on the marching flank has completed the about.

To March by the Flank from Line.

563. Being in line at a halt: 1. *By file, by the right (left) flank,* 2. *MARCH.*

Executed in each rank as in The Soldier Mounted; each rear-rank cannoneer, after completing the wheel, closes in so as to take the same interval from his front-rank man as is prescribed for adjacent files in line.

If marching, the men on the flank toward which the movement is made execute the wheel at the command *march;* the others halt and then wheel in succession.

564. The squad having been marched by the flank is now in column of files. Each cannoneer should so conduct his horse as to maintain the distance of 4 feet from the head of his horse to the croup of the one before him, and so that the man of his rank who immediately precedes him shall hide all the other men in his front.

To Form Line to the Right or Left from Column of Files.

565. 1. ***Right (Left) into Line,*** 2. ***MARCH,*** 3. ***Squad,*** 4. ***HALT,*** 5. ***FRONT.***

Executed as in The Soldier Mounted, each rear-rank man checking his horse so as to follow his front-rank man; the command ***halt*** is given at any time after the leading file has advanced its own length in the new direction. The other files dress as they arrive on the line; the instructor places himself near the right to superintend the movement and gives the last command when all are aligned.

The instructor commands ***left (right) into line,*** according as the column of files is right or left in front.

566. The column of files is ***right in front*** when the front-rank men are on the left of the rear-rank men; the column is ***left in front*** when the front-rank men are on the right of the rear-rank men.

To Oblique in Column of Files.

567. 1. ***Right (left) oblique,*** 2. ***MARCH.***

To resume the oblique march after halting, the commands are: 1. ***Forward,*** 2. ***MARCH.***

To Change Direction in Column of Files.

568. 1. ***Column right (left),*** 2. ***MARCH.***

Executed as in The Soldier Mounted; the pivot man of each file preserves the gait; each man on the marching flank increases the gait to conform to that of the pivot.

Maneuvers of Two or More Gun Squads Mounted.

569. If it is desired to train two or more gun squads mounted in the formations and movements laid down in The Gun Squad Mounted, the squads are maneuvered by the same commands and means as those prescribed for a single squad, with obvious modifications. This instruction should be given during the preliminary period of battery instruction, and carried on simultaneously with the training of the drivers in the maneuvers of a section and a platoon mounted. The squads are formed as described below and their instruction is had under the direction of an officer or noncommissioned officer detailed by the captain, the chiefs of platoon and of section remaining with their respective units.

To Lead Out.

570. The cannoneers lead out by squads in the order of the number of their sections. At the command *lead out* by the instructor or senior noncommissioned officer present, the cannoneers of the first section squad lead out as already explained; the leading cannoneer of each of the squads moves off in time to follow the last cannoneer of the preceding squad and places his horse 15 yards to the left of the front rank horses of this squad. If desired, this interval may be diminished; in this case, upon moving off the squads are formed successively if in column of files, or take the proper distance if in column of squads.

To Post the Mounted Gun Squads at their Carriages.

571. The squads are marched to the park in column of files or column of squads; each gunner, on arriving near the park, marches his squad to its carriage and posts it in its position.

To Leave the Park.

572. The squads are marched by the flank as prescribed for a single squad mounted; the rear squads, if necessary, take the trot at command of the gunner in order to close up to the proper distance.

CHAPTER III.—THE DRIVER.

SECTION I.—*Object and sequence of the instruction.*

573. The object of this instruction is the detailed training of the individual drivers:

First. In harnessing and unharnessing, and in fitting and properly cleaning and caring for harness.

Second. In managing and maneuvering a single pair, and in the proper care of draft horses.

Third. In managing and maneuvering the different pairs of a team hitched.

Quiet, well-trained horses will be used in the instruction of recruits.

574. In order to vary the mounted instruction of recruits, their training as drivers may advantageously be begun as soon as they have had elementary instruction in the duties of the soldier mounted. The two kinds of instruction are then continued concurrently.

SECTION II.—*General provisions.*

575. ***Guides:*** When two or more pairs, teams, or carriages march in line, the instructor, as soon as the march in line is begun, designates the element on one flank or the other as the guide of the movement, thus: ***Guide right (left).*** The other elements align themselves on the guide thus indicated and maintain their intervals from that flank.

If marching in column of pairs, teams, or carriages, or if marching obliquely, the leading element is without indication the guide of the movement.

The guide of a team or carriage is its lead driver. The guide of a section in section column is the guide of its leading carriage; in double section, the guide of its left carriage.

The guide is responsible that the direction and rate of march are properly maintained.

576. ***Intervals and distances:*** The interval between pairs in line is 2 yards; between teams, team length (9 yards); between hitched carriages, carriage length (17 yards).

The distance between pairs in column is 1 yard; between teams or carriages, 2 yards.

577. ***Rests:*** The rests are executed and the attention resumed according to the principles prescribed in The Soldier Mounted; the drivers, when dismounted, remain on the left, close to their pairs, so as to keep them in place.

After exercise, the drivers, when dismounted, should raise the collars from the shoulders and adjust the harness if necessary.

578. ***To stand to horse:*** The driver takes the position with respect to the near horse, prescribed for the soldier mounted, and holds in his right hand the reins of the near horse and the coupling rein.

During detailed instruction the drivers stand to horse (or heel), after completing each detail of the instruction.

SECTION III.—*The individual driver.*

579. Each driver is assigned two horses, which are called a ***pair;*** the horse on the left side is called the ***near horse;*** the other, the ***off horse.*** The driver rides the near horse.

In this instruction not more than three drivers are ordinarily assigned to a single instructor.

Disposition of the Harness.

580. ***In garrison.***—The harness is arranged on two pegs on the heel posts as follows:

On the upper peg: Both bridles hung from the peg by their headstalls; the traces of both horses hung over the peg close to the heel post; the off saddle with its attachments over the seat, the blanket across the saddle; both collars, unlocked, over the blanket.

On the lower peg: The near saddle and blanket arranged as prescribed for the off harness.

The pole yoke, with martingales attached, is hung from a spike driven into the side of the heel post.

To prevent injury to the off saddle when the blankets are kept out to be dried, the sack is put over the harness, and the collars are then placed across the sack.

581. ***In the field.***—The pole prop is placed under the end of the pole. The wheel traces are detached from the collars only, and laid back on the footboards. The remainder of the harness of the near wheel horse is placed on the pole next to the doubletree, arranged as follows: The saddle with its attachments over it, the blanket across the saddle, the bridle and collar over the blanket. The remainder of the off wheel harness is placed next, then the swing and lead harness in the same order. The traces of the swing and lead harness, folded once, are placed across the saddle. The neck yoke is placed on the footboard.

To Harness.

582. A pair of quiet, well-trained horses, in a double stall, is assigned to each recruit, who should be supervised at first by a thoroughly instructed man.

The instructor causes a pair to be harnessed, points out and names the different parts of the harness and explains their uses; he then causes the harness to be taken off and replaced on its pegs.

583. The harness being on the heel posts, the instructor causes the recruits to *stand to heel*, and commands: 1. *By detail*, 2. ***HARNESS.***

Collar.—At this command each driver puts on and locks the collar of his off horse, then that of his near horse.

Saddle.—He puts on the blanket of the off horse, then the saddle with its attachments, taking care not to displace the blanket; buckles the collar strap to the saddle; turns back the back strap and, in the case of wheel drivers, the breeching, and fastens the crupper, and completes the saddling as explained in The Soldier Mounted. He then saddles the near horse in like manner.

Traces.—He lays the middle of the trace of the off horse over the horse's back, behind the saddle, toggles on opposite sides, and, beginning with the off trace, passes the toggles through the loin loops from the rear and attaches them to the tugs on the collar. The traces of the near horse are then attached in the same manner. The rear ends of the traces are left hanging over the backs of the horses.

The traces are not attached when the horses are harnessed for drill by pair.

Bridle.—He bridles the off horse, passes the reins through the roller, and secures the coupling rein to the manger. He then bridles the near horse.

Unless instructions to the contrary are given, the halters are removed before bridling.

Couple.—He backs his pair out of the stall, places them side by side facing the stable exit, attaches the hook at the end of the coupling rein to the right pommel ring of the near saddle, and then stands to horse.

Yoke.—The wheel driver takes down the yoke; places himself between his horses, facing in the same direction with them; fastens the breast strap of the off horse, then that of the near horse; passes the martingale of the near horse between the forelegs, through the standing loop on the cincha; attaches the hooks at the end of the side straps to the martingale D ring; secures the martingale of the off horse in the same manner; then passes out in rear of the near horse, and stands to horse.

To harness without detail: ***HARNESS.***

To Unharness.

584. 1. ***By detail,*** 2. ***UNHARNESS.***

Unyoke.—At this command the wheel driver passes between his horses from the rear, unhooks the martingale of his near horse, and draws the martingale through the standing loop on the cincha; then does the same with respect to the off horse; unhooks the inside end of each breast strap, detaches the neck yoke and hangs it on its spike.

Uncouple.—Each driver steps in front of his horses, uncouples, leads them into the stall, and secures the coupling rein to the manger.

Unbridle.—He unbridles the near horse, puts on the halter, fastens the halter strap to the manger, does the same with respect to the off horse and hangs the bridles on the upper peg, the near bridle next to the post.

Traces off.—He disengages the near trace of the near horse and lays its middle over the saddle, toggle on the near side; disengages the off trace and lays it beside the near trace, toggle on the off side; removes the traces and hangs them on their peg. In like manner he removes and hangs up the traces of the off horse.

Unsaddle.—He unsaddles the near horse as explained in The Soldier Mounted; unfastens the collar strap and crupper and places the attachments over the saddle; places the saddle and blanket on the peg. He then unsaddles the off horse in like manner.

Collar off.—He removes the collar of the near horse, then that of the off horse, and hangs them up, the near collar next to the post.

To unharness without detail: ***UNHARNESS.***

To Harness and Unharness in the Field.

585. Executed as in garrison, with such modifications as the disposition of the harness requires. The horses are ordinarily tied by the halters to the wheels of the carriages while harnessing and unharnessing.

Fitting Harness.

586. When the recruit has become somewhat familiar with the method of harnessing and unharnessing, he will be instructed in fitting harness, the importance of which will be thoroughly impressed upon him.

The *bridle* and *saddle* are fitted as prescribed in The Soldier Mounted.

The *collar,* when adjusted, should freely admit the breadth of the hand between the lower part and the throat, and the thickness of the fingers between the sides and the neck. A short collar chokes a horse by pressing on the windpipe; a narrow one pinches and rubs the neck. A broad collar works about and galls the shoulders.

The *back strap,* when adjusted, should admit the breadth of the hand between it and the horse's back.

The *collar strap* should not be tight; otherwise it will pull the saddle forward on the withers. The surcingle, when used, should be buckled on the near side of the near horse and on the off side of the off horse, less tight than the girth and over it.

The *breech strap* should be adjusted so that it will bear quickly when the horse is required to check the movement of the carriage, but will not impede his movement while in draft. This adjustment is most important. It can best be made by observing the horse in draft and tightening the straps as much as can be done without impeding the free movement of the animal while in draft.

The *hip straps* should be of such length that the breech strap will bear just below the point of the buttocks. The lower the breech strap is adjusted the less does it assist the horse in checking the movement of the carriage.

The *loin straps* should be so adjusted that the traces, when in draft, will be straight and without downward pull on the loops that support them.

The *traces.*—The length of the lead and swing traces must depend in a great measure on the size of the horse and his stride. The rule for lead and swing pairs is to allow about 1 yard from head to point of buttocks when in draft. The length of the wheel trace is fixed, but allowance may be made for difference in the size of the horses by proper adjustment of the martingale and side straps. This will allow a minimum distance of about 14 inches between hindquarters and singletree for the average wheel horse when in draft. The traces should be adjusted so that the line of traction will be straight from the singletree to the collars of the leaders. This rule will regulate, in some measure, the length of the loin straps, the matching of the horses, and the arrangement of the pairs in the team.

The rear trace chains of the lead and swing traces have a ring at one end and a hook at the other; the hook is passed through a D ring at the end of the trace and hooked back into any desired link. By this means the length of the lead and swing traces may be adjusted.

To Lead Out.

587. To form the pairs after harnessing, the instructor indicates the place of formation and whether the formation is to be in line or column of pairs, and commands: ***LEAD OUT BY PAIR.***

The pairs are led out as explained in The Soldier Mounted, and formed at the place designated, as explained in paragraph 478.

To Mount and Dismount.

588. Being at a halt: 1. *Drivers, prepare to mount (dismount),* 2. ***MOUNT (DISMOUNT)***; or, 1. *Drivers,* 2. ***MOUNT (DISMOUNT.)***

Executed as prescribed for The Soldier Mounted. The whip, if in hand, is hung on its ring before dismounting.

Management of a Single Pair.

589. The near horse is managed by the reins and the legs, as explained in The Soldier Mounted; the off horse by the bridle reins and the whip.

By kind and gentle treatment the two horses must be accustomed to work together evenly and to effect changes of gait and direction simultaneously. The off horse must conform to the movements of the near horse, especially in changes of direction, and must neither crowd the near horse nor travel too widely from him. To accomplish this, off horses must be so trained that their hind quarters or forehand may be brought and held in any desired position by the use of the whip or a threat of using it. The whip should be used habitually in driving field artillery teams. The drivers must be taught, however, the proper use of the whip; it should be applied by a simple motion of the wrist, using only so much force as may be necessary to produce the desired effect, and should never be applied about the horse's head or neck.

The coupling rein should be so adjusted as to allow the off horse, especially in turning, to take up an increased gait, maintain his proper trace, and yet be held by the coupling rein to his proper place in the team. In the training of new horses the driver may use the coupling rein to assist in turning the off horse to the right or left, but after the horse is trained the whip alone is sufficient. The coupling rein should never be used to check the off horse's gait, as the use of the coupling rein for this purpose has the effect of pulling the horse's head in and preventing him from traveling squarely.

The bridle reins are used for gathering the off horse, for checking his gait, for reining him back, and for halting him. The lash is habitually held in the left hand, between the thumb and the forefinger, and is sufficiently long for it to be kept so adjusted as to have at all times a very light bearing on the bit.

When necessary to use the bridle reins of the off horse, the driver grasps the reins with the right hand, at a suitable distance from the left, and draws the right hand toward the right thigh; the roller fastened to the off saddle, through which the lash passes, serves to transmit an equal tension to both reins.

Both horses should be gathered before moving from a halt, before halting, and before changing gait or direction, the near horse as explained in The Soldier Mounted, the off horse by a slight additional pressure on the bit. The near horse is then required to move in the desired manner or to halt, the off horse to conform to the movement, the reins being used to check him, or the whip, if necessary, to quicken his movements.

MARCHINGS.

To March to the Front.

590. 1. *Forward,* 2. ***MARCH.***

Each driver moves his pair straight to the front, taking care to maintain his proper relative position in the formation.

To Halt.

591. Being in march: 1. *Drivers,* 2. ***HALT.***

Each driver stops both horses, but not suddenly, and keeps his pair straight.

To March by the Flank.

592. 1. ***By the right (left) flank***, 2. ***MARCH.***

Each driver wheels his pair to the right by moving the off horse over a quarter circle whose radius is 4 yards, and causing the near horse to quicken his movements so as to keep abreast of the off horse. On the completion of the wheel, each driver moves his pair straight to the front in the new direction.

If executed from line, the pairs are in ***column of pairs;*** each driver conducts his pair so that the man who immediately precedes him will hide all the other men in front.

If executed from column, the pairs are in ***line of pairs;*** the pairs at once align themselves toward the guide and take their interval from his flank.

To March to the Rear.

593. 1. ***Right (left) about***, 2. ***MARCH.***

Executed as explained for the march by the flank, except that each driver moves his pair over a half circle instead of a quarter circle.

If executed at a trot or a gallop, the radius is slightly increased and the gait moderated.

To March Obliquely.

594. 1. ***Right (left) oblique***, 2. ***MARCH.***

Executed as explained for the march by the flank except that each driver moves his pair over an eighth of a circle instead of a quarter circle. During the oblique march the drivers maintain their relative positions with respect to each other so that on executing a second oblique they will be in line or column, as the case may be, with proper intervals or distances.

To Change Direction in Column of Pairs.

595. 1. ***Column right (left)***, 2. ***MARCH.***

The leading driver marches by the flank; the other drivers march squarely up to the wheeling point and execute the change of direction on the same ground.

Column half right (half left) is similarly executed, the change of direction being 45° instead of 90°.

To Rein Back.

596. Being at a halt: 1. ***Backward,*** 2. ***MARCH,*** 3. ***Drivers,*** 4. ***HALT.***

Both horses are reined back evenly and kept straight. This movement is used only for the purpose of moving the horses a few steps to the rear.

Alignments.

597. Being in line at a halt, the instructor sees that the driver on the flank toward which the alignment is to be made is in the desired position and commands: 1. ***Right (left),*** 2. ***DRESS,*** 3. ***FRONT.***

At the command ***dress,*** the other drivers look to the right and align themselves accurately, keeping their pairs straight and preserving their intervals. At the command ***front,*** they turn their eyes to the front.

The instructor may place himself on either flank, and give a general alignment by ordering any driver to move one or both of his horses forward or backward.

To Dismiss the Drivers.

598. The instructor may conduct the drivers in column of pairs into the stable and halt the column so that each driver is opposite his stall; or he may first form the drivers in line of pairs in the vicinity of the stable or park, and command: 1. ***By the right (left),*** 2. ***FILE OFF.*** In the latter case the drivers file off in succession, as explained in The Soldier Mounted, and halt when opposite their stalls or the place designated for unharnessing.

The instructor then commands: ***Unharness,*** or ***By detail unharness.***

The harness is removed, cleaned, and properly put in place; the horses rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed and that all the precautions required on return from exercise have been observed, the instructor causes the harness to be covered, orders the men to ***fall in,*** marches them to the battery parade ground, and dismisses them.

SECTION IV.—*The team hitched.*

599. The drivers being well instructed in their individual duties in managing and maneuvering a single pair, their further instruction as lead, swing, and wheel drivers of a team hitched to its carriage is taken up.

600. The pairs assigned to the traction of a single carriage are termed collectively a ***team.*** A team usually consists of three pairs. The pair in front is called the ***lead pair;*** the one attached to the carriage, the ***wheel pair;*** the pair between these two, the ***swing pair.*** When there are two pairs between the lead and wheel pairs, they are called the ***lead swing*** and ***wheel swing*** pairs.

601. The instruction is described for teams hitched, and for convenience, a temporary section consisting of two carriages is considered. With obvious modifications, the instruction is applicable to a single team or to several sections, hitched or unhitched.

602. Training with the teams hitched is regarded as the rule; but when the ground is soft or otherwise unsuitable for drill with the carriages, the instruction may be had with teams unhitched.

To Hook Traces.

603. The teams being in column of pairs in proper order from front to rear, the instructor commands: ***HOOK TRACES.***

Each swing driver goes to the rear of his off horse, passing by his off side, and hooks the rear ends of the swing traces to the front ends of the corresponding wheel traces, beginning with the outer trace of the off horse and ending with the outer trace of the near horse.

Each lead driver in like manner hooks the rear ends of the lead traces to the front ends of the corresponding swing traces.

The traces may be hooked either before or after leading out.

To Unhook Traces.

604. ***UNHOOK TRACES.***

Each swing driver backs his pair, if necessary, in order to unhook more easily. He then goes in rear of his horses, passing by the near side of the near horse, and detaches the swing traces from the wheel traces, beginning with the outer trace of the near horse and ending with the outer trace of the off horse. As each trace is unhooked, its end is placed over the back of the horse in rear of the saddle.

Each lead driver in like manner unhooks the lead traces.

The traces may be unhooked before or after leading into the stable.

To Lead Out.

605. The teams being harnessed, and traces hooked or unhooked, the instructor designates the place and order of formation, and commands: ***Lead out by team.*** The teams are led out in turn and formed in line or column of teams, as may be prescribed by the instructor.

If the teams are to be hitched at once and the carriages are near by, the teams may be led directly from the stable to the carriages.

Disposition of the Carriages of a Section.

606. The carriages of a section are said to be in ***section column*** when one is in rear of the other, with a distance of 2 yards from the rear of the leading carriage to the heads of the lead horses of the following carriage; or, if unhitched, with a distance of 8 yards from the rear of the leading carriage to the end of the pole of the following carriage. They are ordinarily parked in this formation.

They are said to be in ***flank column*** when abreast of each other at 17 yards interval; and in ***double section*** when abreast of each other at 2 yards interval.

To Post the Teams with their Carriages.

607. The teams are marched to the park in column of teams, and directed so as to approach the flank and rear of the carriages. As the head of the column approaches the carriages the instructor commands: ***TEAMS TO YOUR POSTS.***

Each team, as it comes opposite its carriage, wheels from the column and proceeds to its carriage; having passed the front wheel, the drivers incline toward the pole and then move forward so as to place the team in proper position, the wheel driver causing the horse next to the pole to step over it, the front end of the pole resting on the ground.

To Hitch.

608. The traces being hooked: 1. ***Drivers***, 2. ***HITCH***.

Each wheel driver dismounts, if mounted; passes behind the near horse; places himself between his horses, on the right of the pole; engages the end of the pole in the pole-yoke ring; then goes behind the off horse and attaches his traces to the singletree, beginning with the near trace. He then passes around the rear of the carriage at double time, and hitches the near horse, beginning with the off trace.

He then mounts, if mounted when the command was given; if dismounted, he stands to horse.

609. If cannoneers be present, the instructor may command: 1. ***Cannoneers***, 2. ***HITCH***.

No. 1 at the piece and the highest odd-numbered cannoneer at the caisson, each engages the end of the pole of his carriage in the pole-yoke ring and hitches the near wheel horse; the gunner at the piece and the highest even-numbered cannoneer at the caisson, each hitches the off wheel horse of his carriage.

To Unhitch.

610. 1. ***Drivers***, 2. ***UNHITCH***.

Each wheel driver dismounts, if mounted; detaches the traces of his near horse, and places the end of the traces over the horse's back behind the saddle, as prescribed for harnessing; passes around the rear of the carriage at double time and unhitches his off horse in like manner; passes between his horses, disengages the pole from the pole-yoke ring and lowers the pole to the ground. He then mounts, if mounted when the command was given; if dismounted, he stands to horse.

611. If cannoneers be present, the instructor may command: 1. ***Cannoneers***, 2. ***UNHITCH***.

No. 1 at the piece and the highest odd-numbered cannoneer at the caisson each unhitches the near wheel horse of his carriage and disengages the pole; the gunner at the piece and the highest even-numbered cannoneer at the caisson each unhitches the off wheel horse of his carriage.

To Dismiss the Teams from the Park.

612. 1. ***By the right (left)***, 2. ***FILE OFF***.

The team of the leading carriage on the right flank moves by the right flank; the other teams follow in turn at 2 yards distance, teams of rear-rank carriages inclining toward the right so as to pass the front-rank carriages and enter the column behind their front-rank teams.

The teams may then be conducted to the stable and the drivers dismissed as explained in paragraph 598. If the traces are hooked the instructor gives the command ***unhook traces,*** before giving the commands for unharnessing.

Management of Teams in Draft.

613. In all movements from a halt, each driver gathers both of his horses just before they are to move; if in march and the gait or direction is changed, both horses are gathered just before they change the gait or direction. Care should be taken that all the horses of a team move off together and change the gait at the same time.

614. In starting a carriage, it is especially important that all the horses of the team should throw their weights into the collars gradually but simultaneously. To insure this, all traces must be stretched before the team moves. A common fault is to start one pair before the others are in draft, the tendency of which is to make the team balky. The swing driver should regulate his movements by those of the lead driver, and the wheel driver by the swing; the wheel driver must be especially careful that his pair neither lags nor attempts to start the carriage alone. Unremitting attention is required upon the part of every driver in the team, in order that each pair shall at all times do its proper share of the work.

By observing these important rules, a team is enabled to pull steadily together and the horses are not fatigued by jerks, which make them balky, gall their shoulders, and break the harness.

615. In reducing the gait or in halting, the movement must be checked gradually so as not to bring undue strains upon the horses or the harness. Ordinarily about 2 yards should be gained in bringing a carriage to a halt from a walk; in the exceptional cases when carriages are halted while moving at rapid gaits, from 5 to 10 yards should be gained in halting from a trot; from 10 to 15 in halting from a gallop.

The command for halting must be so given that the carriages may be properly brought to rest at the place desired.

616. The gaits are always changed gradually so as not to strain or worry the horses by sudden movements. In all cases whether moving from a halt, changing gait, or halting, the horses should be made to act together, but they should always be handled quietly and kindly, and allowed a sufficient time for their movements.

The wheel driver is responsible for checking the gait, and for halting or backing the carriage; the lead and swing drivers regulate the movements of their pairs by those of the wheel pair, keeping out of the way but avoiding any strain on the traces.

617. In all changes of direction the carriage is under the control of the wheel driver, who is responsible for its correct movements. The lead and swing drivers keep their traces stretched and aid in the draft as much as possible, but must be careful to avoid the tension that would pull the wheel pair out of its proper direction.

618. In executing the abouts, the countermarch, and the wheels, at a trot or gallop, the radius is sufficiently increased to permit the horses to execute the movement with ease; and in the abouts and the countermarch, the gait is moderated to avoid overturning the carriages.

MARCHINGS.

To March to the Front.

619. 1. *Forward,* 2. *MARCH.*

The teams move out simultaneously and march straight to the front. If in column, they take the track and distance from the carriage ahead; if in line, they preserve the alignment and the interval from the guiding flank.

To Halt.

620. 1. *Section,* 2. *HALT.*

Executed by each team as explained in paragraph 591. The traces are stretched as soon as the carriage is halted, by moving the horses a step or two forward.

To March by the Flank.

621. 1. *By the right (left) flank,* 2. *MARCH.*

Each lead driver wheels his pair to the right, as explained in paragraph 592. The swing and wheel drivers follow the lead, and wheel to the right on the same ground.

If executed from section column, the carriages are in flank column after the movement is completed, and a guide is at once announced. If executed from flank column, the carriages are in section column and the rear carriage takes at once the track and distance from the carriage which precedes.

To March to the Rear.

622. 1. By an about: 1. *Right (Left) about,* 2. *MARCH.*

Each lead driver executes an *about,* as explained in paragraph 593. The swing and wheel drivers follow the lead, and execute the about on the same ground.

On the completion of the movement the carriage in rear quickly takes the track and distance from the carriage which now precedes in the movement.

2. By a countermarch. The section being in section column: 1. *Countermarch,* 2. *MARCH.* The leading carriage of the section executes a left about as just prescribed; the rear carriage follows in the track of the leading carriage and executes a left about on the same ground.

To March Obliquely.

623. 1. *Right (Left) oblique,* 2. *MARCH.*

Each lead driver executes an oblique as explained in paragraph 594. The swing and wheel drivers follow the lead, and execute the oblique on the same ground.

The carriages move on parallel lines, the lead drivers regulating their march so that, on executing a second oblique, they will have their proper relative positions in line or column, as the case may be.

To Change Direction.

624. 1. *Right (Left) wheel,* 2. *MARCH.*

If in section column, the leading carriage wheels to the right as explained in paragraph 621; the rear carriage follows in the track of the leading carriage, and wheels on the same ground.

625. In flank column, the pivot carriage wheels to the right as explained in paragraph 621; the other carriage increases the gait one degree, preserving its interval from the pivot carriage, and takes the gait of the latter on arriving abreast of it.

626. The *right* or *left half wheel* is similarly executed in both cases,

To Form Flank Column from Section Column.

627. 1. ***Flank Column,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

The rear carriage of the section obliques to the right and places itself abreast of the leading carriage at an interval of 17 yards.

If executed from a halt or while marching at a walk, the leading carriage moves forward three carriage lengths and halts; the rear carriage halts on reaching its position. If executed while marching at a trot or gallop, the leading carriage reduces the gait to a walk or trot, as the case may be; the rear carriage takes the gait of the leading carriage on arriving abreast of it.

If the instructor announces an increased gait for the movement, the leading carriage maintains its gait; the rear carriage takes the increased gait, and takes the gait of the leading carriage on arriving abreast of it.

To Form Section Column to the Front from Flank Column.

628. 1. ***Piece (Caisson) front,*** 2. ***MARCH.***

The designated carriage moves straight to the front; the other carriage obliques toward the designated carriage in time to follow in its track at 2 yards distance.

If the movement is executed while marching and no increased gait is ordered, the designated carriage maintains its gait; the other carriage reduces its gait one degree, or halts if marching at a walk, and resumes the gait in time to follow the movement. If an increased gait is ordered, the designated carriage takes it at once; the other in time to follow the movement.

To Form Double Section and to Resume the Previous Formation.

629. Being in section column: 1. ***Double section,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

The rear carriage of the section inclines to the right and places itself abreast of the leading carriage at an interval of 2 yards.

The rules for gaits are as prescribed for forming flank column from section column. (Par. 627.)

630. To form again in section column: 1. ***Piece (Caisson),*** 2. ***Front,*** 3. ***MARCH.***

The designated carriage moves straight to the front; the other carriage inclines toward the designated carriage in time to follow in its track at 2 yards distance. The rules for gaits are as prescribed for forming section column from flank column. (Par. 628.)

631. Being in flank column: 1. ***Double section,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

The left carriage inclines sharply toward the right carriage, and moves up abreast of it at 2 yards interval. The rules for gaits are as prescribed for forming flank column from section column (par. 627), the right carriage conforming to what is prescribed for the leading carriage; the left carriage, to what is prescribed for the rear carriage.

632. To form again in flank column: 1. ***Flank column,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

The right carriage inclines sharply away from the left carriage and then moves up abreast of it at 17 yards interval. The rules for gaits are as prescribed for forming flank column from section column (par. 627), the left carriage conforming to what is prescribed for the leading carriage; the right, to what is prescribed for the rear carriage.

633. The section being formed in double section, retains that formation until again formed in section or flank column, and is maneuvered as if it were a single carriage. In executing the wheels, the abouts, and the oblique, the pivot carriage executes the movement as heretofore prescribed; the other carriage conforms to the movement of the pivot carriage, increasing the gait so as to arrive abreast of the latter without delay.

Passage of Carriages.

634. Being in section column, to place the rear carriage in front, the instructor commands: 1. ***Piece (Caisson),*** 2. ***Front,*** 3. ***MARCH.***

The carriage designated in the command is the rear carriage in the existing formation.

The designated carriage inclines to the right, passes the other carriage, takes position in front of it, and continues the march; the carriage then in rear follows at 2 yards distance.

If marching and an increased gait is not ordered, the designated carriage maintains its gait; the other reduces the gait one degree, or halts if marching at a walk, and resumes the previous gait in time to follow at the proper distance.

If an increased gait is ordered the designated carriage takes it at once; the other takes it in time to follow at the proper distance.

Unlimbering and Limbering.

635. The drivers are practiced in their duties in unlimbering and limbering as prescribed in paragraphs 223, 224, 225, 228, and 229, cannoneers being posted with each carriage for the necessary handling of the gun and caisson.

To Back the Carriages.

636. ***To the rear:*** Being at a halt, to move a short distance to the rear: 1. ***Backward,*** 2. ***MARCH,*** 3. ***Section,*** 4. ***HALT.***

The drivers rein back their horses, taking care to keep the pole straight; at the command ***halt,*** they halt and stretch the traces.

637. ***To the right or left:*** Being at a halt: 1. ***Right (Left) backward,*** 2. ***MARCH,*** 3. ***Section,*** 4. ***HALT.***

At the first command the drivers of each team swing the team to the right without advancing or backing the carriage until the limber wheel nearly touches the wheel-guard plate; at the command ***march*** they rein the horses back, taking care to keep them to the right; at the command ***halt*** they straighten the team and carriage and halt.

Whenever a carriage has to turn in a narrow space, as a street or lane, this method of backing may be used, or the carriages may be unlimbered and turned by hand.

To Dismount the Drivers while Marching.

638. Being at a walk: 1. ***Drivers,*** 2. ***DISMOUNT.***

Each driver dismounts without checking the gait, places the bridle reins of his near horse over the pommel, and walks beside him without touching the reins, unless it is necessary to check his pair; if either one of his pair lags, he threatens him or touches him lightly, with his whip.

If necessary to guide the carriage to a definite position, the driver seizes the reins in the manner prescribed in ***Stand to horse,*** and thus controls the movement.

If the instructor commands: 1. ***Lead and swing drivers,*** 2. ***DISMOUNT,*** only the drivers named dismount.

To Mount the Drivers while Marching.

639. Being at a walk: 1. ***Drivers,*** 2. ***MOUNT.***

All the drivers who are dismounted mount without checking the gait.

If the instructor commands: 1. ***Wheel drivers,*** 2. ***MOUNT,*** only the drivers named mount.

Marching with the drivers dismounted will be practiced over smooth, level ground at first until the teams are taught to pull together and to walk with an even, regular gait.

CHAPTER IV.—THE BATTERY MOUNTED.

SECTION I.—*Object and sequence of the instruction.*

640. The special object of this instruction is the training of the personnel of the battery in the dispositions and maneuvers requisite for getting the guns into position for action. Methods of training in opening and delivering fire have been laid down in Firing Instruction. The two kinds of training supplement each other and should be practiced concurrently.

641. A progressive order of instruction should be observed. The section and the platoon having each been instructed by its chief, the captain takes up and completes the training of the battery as a whole.

The captain requires the ***section mounted*** and the ***platoon mounted,*** properly manned, horsed, and equipped, to be instructed by their chiefs in accordance with the principles prescribed for the ***battery mounted.*** The exercises of these units, acting separately, are ordinarily elementary in their nature and preparatory to their combined work in the battery. Such exercises are accordingly executed with great precision and attention to detail.

On the ordinary drill ground the battery is practiced in maneuvering and in fire discipline so that the details of each are thoroughly understood and well performed by the personnel of the battery and so that the various units of the battery work together smoothly and effectively under the direction of the captain. Opportunities should then be sought for practice over all available kinds of ground to the end that the personnel may become accustomed to adapting the principles learned on the drill ground to the accidents of a varied terrain.

Frequent practice should be had in the selection of observing stations, the reconnaissance of targets, the selection of firing positions, advancing to and occupying firing positions, under different conditions, the determination of firing data for direct and indirect laying at fixed and moving targets, simulated fire, etc. This practice should approximate the conditions of war as nearly as possible.

SECTION II.—*General provisions.*

642. All men of the battery should be instructed in the duties of both the cannoneer and driver.

643. In order that all the horses may be available in an emergency for any place in the battery, the team horses should be taught to work in the lead, swing, and wheel pairs; and on both the off and near sides. Saddle horses should occasionally be worked in harness, and team horses used as saddle horses.

644. During instruction, the saber is in the scabbard or drawn, at the discretion of the captain. When the captain draws saber, the chiefs of platoon also will draw saber.

At mounted instruction, the saber is habitually attached to the left side of the saddle; on dismounting for fire action, it is not removed.

645. Unless otherwise stated, the text refers to light batteries. With necessary modifications in distances and in the duties of cannoneers, it becomes equally applicable to horse batteries.

Special directions are given herein when the gun squads of horse batteries have to make any particular movement. When the gun squads are not mentioned, they have only to maintain their posts in rear of their caissons, dressing toward the side of the guide. In section column the guide of each gun squad is without indication to the right. When flank column or double section column is formed, the gunners form their squads on the outer flank of the caisson, the cannoneers of the front rank aligned on the axle of the limber.

646. A ***gun section*** consists of a gun and its caisson, manned, horsed, and equipped.

A ***caisson section*** consists of two caissons, manned, horsed, and equipped.

The leading caisson of each caisson section in the normal order in park is called the ***first caisson;*** the other is called the ***second caisson.*** What is prescribed in the text for pieces and caissons of gun sections applies, with obvious modifications, to first and second caissons of caisson sections, respectively.

647. The rests are executed and the attention is resumed according to the principles already explained.

SECTION III.—*Organization of the battery.*

648. On a war footing, the battery is organized in nine sections.

The first, second, third, and fourth sections are gun sections.

The fifth, sixth, seventh, and eighth sections are caisson sections.

The ninth section comprises the battery wagon, the store wagon, and the allotted field wagons.

The first and second sections constitute the first platoon. It is commanded by the senior lieutenant.

The third and fourth sections constitute the second platoon. It is commanded by the lieutenant second in rank.

The fifth and sixth sections constitute the third platoon. It is commanded by the lieutenant third in rank.

The seventh and eighth sections constitute the fourth platoon. It is commanded by the lieutenant fourth in rank.

The ninth section is commanded by the quartermaster-sergeant.

649. On subdivision for action the battery is divided into the ***firing battery,*** the ***combat train,*** and the ***field train.***

The firing battery comprises the first five sections. It is under the immediate command of the captain.

The combat train comprises the sixth, seventh, and eighth sections, the battery wagon, the store wagon, the reserve men and at least one pair of harnessed wheel horses and one pair of harnessed lead horses. It is commanded by the junior lieutenant, who is assisted by the stable sergeant.

The field train comprises the allotted field wagons and such personnel as may be directed to accompany them. It is commanded by the quartermaster sergeant.

650. On a peace footing the seventh and eighth sections are not manned or horsed. With this exception, the personnel, animals, and matériel allowed on a peace footing are organized as prescribed for a war footing, the captain making such assignments as may be necessary to replace personnel and animals not authorized on a peace footing.

651. The *battery of maneuver* is ordinarily composed of the first, second, and third platoons, manned, horsed, and equipped. The instruction, however, is applicable to a greater or less number of platoons. For the training of horses and drivers, the entire battery is practiced in marching and maneuvering; before taking the *order in battery,* however, the battery is subdivided for action, the fifth section forming part of the firing battery, the sixth section representing the combat train.

652. The personnel of the battery of maneuver comprises the captain, four lieutenants, the first sergeant, six chiefs of section, four gun squads, two caisson squads, the musicians, the guidon, and a driver to each pair of horses.

SECTION IV.—*Duties of officers, noncommissioned officers, etc.*

653. The *captain* commands the battery and is responsible for its training and efficiency.

The *lieutenants* command platoons, and are responsible to the captain for the efficiency of the men and the serviceable condition of the animals and matériel of their platoons.

The *first sergeant* is assistant to the captain, and is responsible to him for the general good order, police, and discipline of the battery. In action he supervises the replacement of ammunition and casualties and has charge of the limbers.

The *quartermaster sergeant* is responsible to the captain for the general care and maintenance of the Government property issued to the battery.

The *stable sergeant* is responsible to the captain for the general care of the public animals assigned to the battery and the good order and police of the stables, picket lines, etc.

The *chief mechanic* is responsible to the captain for the good order and repair of the matériel in actual use by the battery;

for this purpose he has general supervision of the battery mechanics.

The *sergeants* command sections, and are responsible to the chiefs of platoon for the efficiency of the men and the serviceable condition of the animals and matériel of their sections.

The *gunners* are responsible to their chiefs of section for the good order of their guns, carriages, limbers, and equipment.

The *caisson corporals* are responsible to their chiefs of section for the good order of their caissons, equipment, etc.; also for the serviceable condition of the caisson teams, harness, equipment, etc.

The drivers are directly responsible to their chiefs of carriage for their horses, harness, and equipment.

It is the duty of both drivers and cannoneers to report at once to their chiefs of carriage any injury to their horses or matériel, or any deficiency in their equipment.

654. The captain, lieutenants, sergeants, caisson corporals, chief mechanic, horseshoer, mechanics, drivers, guidon, and musicians are mounted. The necessary privates for the scout and signal details should also be mounted.

The cannoneers are on foot or mounted on the carriages, at the discretion of the captain; they are not ordered to mount or dismount when the battery is marching at a trot or gallop.

On the march in the field the cannoneers are usually mounted on the chests, axle seats, and off horses, for rapid movements only.

In horse batteries everyone is mounted; the cannoneers, except the horse holders, dismount to serve the guns.

SECTION V.—*Formations of the battery and posts of individuals.*

Formations.

655. The habitual formations are the *order in line,* the *order in section column,* the *order in flank column,* and the *order in battery.*

656. The *order in line* is that in which the sections of the battery are formed abreast of each other in the order, or the reverse order, of their numbers from right to left. The carriages are limbered, and in each section are in section column, the pieces being either in front or in rear of their caissons. In the normal order in *park* the pieces are usually in front.

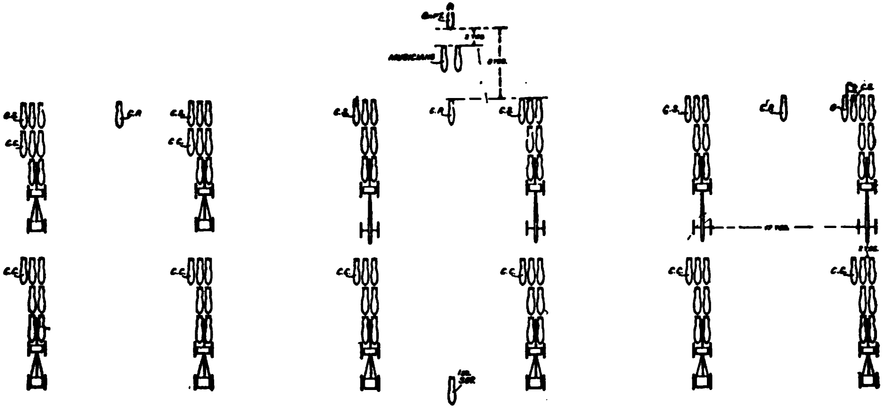

PLATE 14, Par. 656

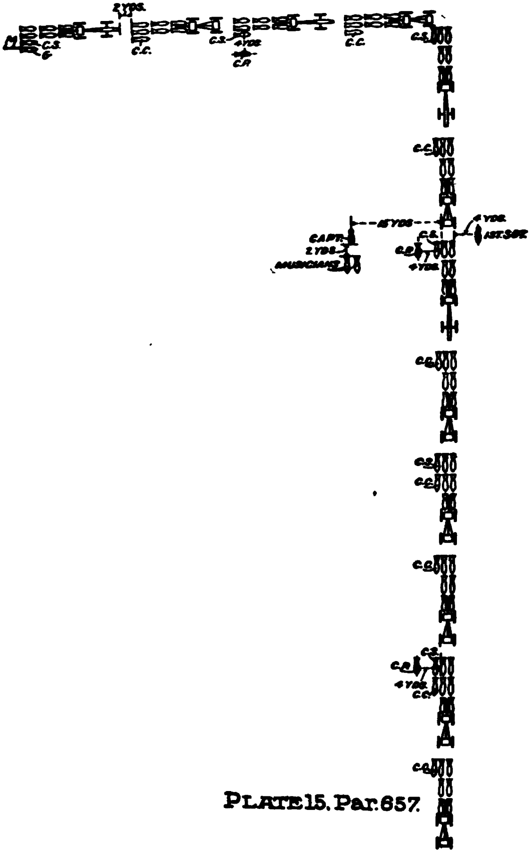

PLATE 15. Par. 657.

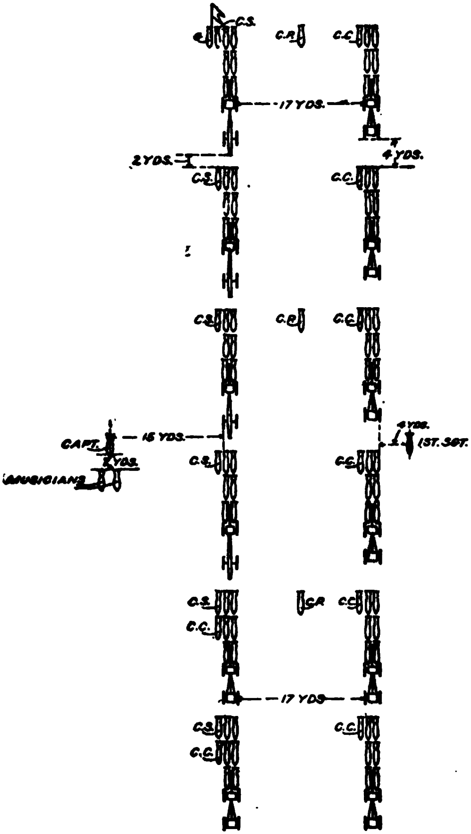

PLATE 16, Par. 658.

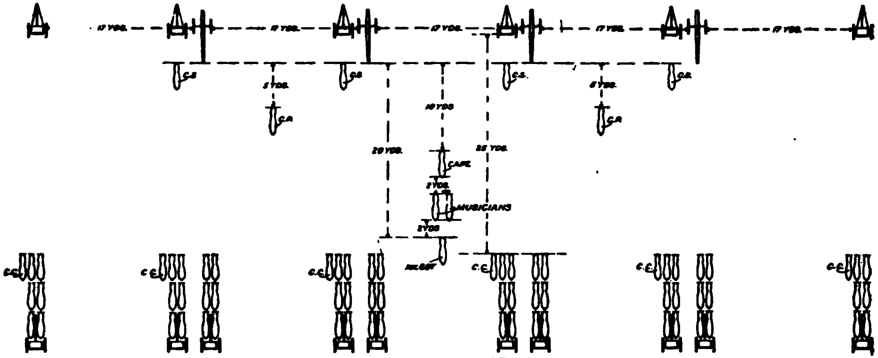

PLATE 17. PAR 659.

If the carriages of each section are in double section, the formation is called a *double section line*.

657. The *order in section column* is that in which the sections of the battery follow each other in the order, or the reverse order, of their numbers, from front to rear. The carriages are limbered, and in each section are in section column, the pieces being either in front or in rear of their caissons.

If the carriages of each section are in double section, the formation is called a *double section column*.

658. The *order in flank column* is that in which the sections of the battery follow each other in the order, or the reverse order, of their numbers, from front to rear. The carriages are limbered, and in each section are in flank column, the caissons being all either on the right or left of their pieces.

659. The *order in battery* is that in which the pieces and caissons of the gun sections, unlimbered for action, are placed in line in the order, or the reverse order, of their numbers, from right to left; the caissons of the fifth section, unlimbered, one on each flank of this line; and the limbers either in rear of their unlimbered carriages, or formed at such other place as the captain may direct.

The reserve, consisting of such other caissons, etc., as may be present, is posted at the discretion of the captain.

660. In line and in flank column, the normal interval between carriages, measured between adjacent wheels, is 17 yards. In the order in battery, the interval is the same, but is measured between adjacent wheels of gun carriages.

661. In column or in line, the distance between two carriages, or between a carriage and a mounted squad, is 2 yards, except that in flank column the distance between caissons is 4 yards; and, in line, when the pieces lead, the distance between caissons of the caisson sections is 4 yards. In battery, when the limbers take post in rear of their carriages, the distance between the line of pieces and the limbers is 25 yards, measured from the rear of the caissons to the heads of the lead horses.

662. When the teams have but two pairs of horses, the intervals are diminished 3 yards; should the teams have four pairs, the intervals are increased 3 yards.

If any carriage has lost one pair of horses, or more, it has the same position as if the team were complete.

663. *Posts of*

Individuals.	Order in line.	Order in section column.
Captain	8 yards in front of the battery, opposite the center.	Opposite the center of the column and 15 yards from the left flank.
Platoon commander ...	Halfway between his sections and in line with the lead drivers of his leading carriages.	Opposite the center of his platoon, 4 yards from the left flank.
First sergeant.	Halfway between the center sections, opposite the rear of the rear carriages.	Opposite the center of the battery, 4 yards from the right flank.
Chief of section.	Boot to boot with the lead driver of his leading carriage.	Same as in line ....
Caisson corporal.	Boot to boot with the lead driver of his caisson; but if the chief of section is posted with the caisson, then boot to boot with the swing driver.	.....do ....
Guidon	Abreast of the guide of the battery, and 2 yards to his left. Before leaving park, 4 yards from the right flank of the battery aligned on the lead drivers.	Abreast of the leading guide of the battery, and 2 yards to his left.
Musicians ...	Boot to boot with each other, 2 yards in rear of the captain.	Same as in line ....

664. The members of the gun squad are posted as explained in paragraphs 200 and 209. In horse batteries, the post of the gun squad with the carriages limbered is 2 yards in rear of the caisson, except as provided in paragraph 645. When the carriages are unlimbered, the horse holders, with the horses of the squad, take post 2 yards in rear of the caisson limber.

665. When the quartermaster and stable sergeants are present with the battery of maneuver, they are posted boot to boot in order of rank from right to left, as follows: In line, 4 yards from the left flank of the battery, abreast of the lead drivers; in battery, 4 yards from the left flank of the line of limbers, abreast of the lead drivers; in section or flank column, they are either 4 yards in front of the leading section, or 4 yards in rear of the last section, according as the column has been formed toward their flank of the battery or the flank opposite. During the maneuvers of the battery they retain their relative *individuals.*

Order in flank column.	Order in battery.
Opposite the center of the column and 15 yards from its flank; on the left when the right section leads, and on the right in the reverse order.	Halfway between the two center sections, 10 yards in rear of the line of the trail spades.
Halfway between the pieces and caissons, and in line with the lead drivers of his leading carriages.	Halfway between the guns of his platoon, and 5 yards in rear of the line of the trail spades.
Opposite the center of the column and 4 yards from its flank; on the right when the right section leads, and on the left in the reverse order.	Halfway between the two center sections, 20 yards in rear of the line of the trail spades.
Boot to boot with the lead driver of his piece. In double section he has the same post.	2 yards in rear of his caisson and opposite its center.
Boot to boot with the lead driver of his caisson.	Same as in line.
Abreast of the guide of the battery, and 2 yards to his left.	With the combat train.
Same as in line...........................	Same as in line.

positions and do not change to the opposite flank on account of the battery being faced to the rear.

666. The chief mechanic, horseshoers, mechanics, and cooks, when present with the battery of maneuver, are assigned posts and duties as members of gun or caisson squads.

667. The posts designated in the foregoing table are the typical ones. The captain, however, goes wherever his presence is required, where he may best observe, and where his commands may best be heard. The lieutenants leave their posts if it is necessary for the purpose of supervising the work of their platoons. The chiefs of section habitually maintain their posts during the maneuvers of the battery; but during the practice of fire discipline, during marches, and at other times when necessary, they leave their posts in order to supervise the work of their sections.

SECTION VI.—*The park.*

Disposition of the Carriages in Park.

668. The carriages are ordinarily arranged in park in the order in line, the sections arranged from right to left in the order of their numbers, the pieces in the front rank. The interval between adjacent carriages may be either the normal interval of 17 yards or such interval as the captain may direct; the distance between the ranks of carriages is 8 yards, measured from the rear of the front rank carriage to the end of the pole of the rear rank carriage.

The battery wagon, the store wagon, and the field wagons are parked on the left in the same formation as the other carriages, or in a third rank, as may be prescribed by the captain.

To Form the Battery in the Park.

669. The battery, dismounted, being formed on the battery parade, the first sergeant commands: ***Drivers fall out.***

The chiefs of section, caisson corporals, guidon, musicians, and drivers step 6 yards to the front and form facing to the front in double rank opposite the center of their respective sections; the chiefs of section place themselves in front, and the caisson corporals in the line of file closers, of the squads thus formed. The first sergeant sees that suitable cannoneers are detailed to replace absent drivers, closes the drivers toward either flank, and directs the senior chief of section to march them to the horses.

On arrival at the stable or picket line, the chief of section in charge halts the drivers and commands: ***Harness.*** The drivers fall out and harness under the supervision of their respective chiefs. Chiefs of section and other mounted men not drivers saddle their horses while the drivers harness.

The drivers having been marched off, the first sergeant forms the gun squads and directs the senior gunner to march them to the park. The senior gunner posts the squads with their carriages and causes the paulins to be removed, folded, and strapped on the chests.

If the carriages are in a gun shed, the column is halted in front of the building, the senior gunner gives the necessary directions for the formation of the park, and commands: ***Form park.***

The cannoneers fall out, the carriages are run out by hand and formed in park.

The park being in order, the senior gunner commands: 1. *In front* (*rear*) *of the pieces* (*caissons*), 2. *FALL IN.* He requires the squads to call off, and posts the cannoneers with their pieces. While waiting for the teams to arrive in park, the senior gunner may cause the cannoneers to rest or to fall out. Upon the arrival of the teams, he causes the cannoneers to resume their posts at attention.

When the horses are harnessed the first sergeant commands: *Lead out by team.* The sections lead out in turn and form in column. The first sergeant mounts the drivers, conducts the column to the park, posts the teams with their carriages, and causes them to be hitched.

If the park is near by, the captain may direct that the teams of each section, as soon as harnessed, be led out, posted with their carriages, and hitched, under the direction of their chiefs of section. In this case the senior chief of section, on the arrival of the drivers at the stables, commands: *Harness and hitch.*

In all cases the first sergeant sees that the cannoneers perform their duties in the park, and that the drivers harness, lead out, and hitch with the least practicable delay and without noise or confusion.

670. In the field when the horses are harnessed at the carriages, the duties are performed in a similar manner. The senior chief of section, on the arrival of the drivers at the picket line, commands: *Harness and hitch.* The teams are hitched by the drivers, under the direction of their chiefs of section, according to the methods heretofore prescribed.

671. In horse batteries as soon as the park is formed and the carriages made ready for use, the senior gunner directs the gunners to march their squads to the horses and have the horses saddled.

The squads may be required to lead out with the teams of their sections. In this case they form in rear of the teams and are marched to the park with them, each gunner posting his squad in rear of its caisson as the teams of the section are being posted with their carriages.

If the squads are not ready when the teams are harnessed, the first sergeant may direct that the teams be led out and posted as above prescribed: when ready each squad is then led out and formed by its gunner, marched to the park, and posted.

672. The quartermaster and stable sergeants, if present, and the guidon take their posts during the hitching. The musicians report to the captain at such time and place as he may direct. The chiefs of platoon join their platoons as soon as the teams are posted with the carriages and superintend the hitching.

673. Each chief of section, as soon as his teams are hitched, makes a minute inspection of his section and reports the result to his chief of platoon.

674. Each chief of platoon, having received the reports of his chiefs of section and made a general inspection of the platoon, commands: ***REST***.

675. Upon the approach of the captain the chiefs of platoon call their platoons to attention, and as soon as the captain takes his place in front, report in succession from right to left: ***(Such) platoon in order, sir;*** or if anything be missing or out of order they so report.

As soon as the chiefs of platoon have reported, the first sergeant reports to the captain, as prescribed in paragraph 121.

To Dismiss the Battery.

676. As soon as the battery is parked each chief of section makes a minute inspection of his section and reports all losses or injuries to the chief of platoon; the chiefs of platoon then report in succession from right to left: ***(Such) platoon in order, sir;*** or if anything be missing or out of order they so report.

The reports having been made, the captain gives such instructions as may be necessary, and directs the first sergeant: ***Dismiss the battery.*** The officers return saber, if drawn, and fall out.

The first sergeant commands: 1. ***Drivers,*** 2. ***UNHITCH;*** or, 1. ***Cannoneers,*** 2. ***UNHITCH.***

The quartermaster and stable sergeants and the guidon leave the park and return their horses to the stable or picket line; the gunners cause their cannoneers to clean and cover or put away their guns and carriages, as may be directed by the first sergeant.

The teams being unhitched, the first sergeant commands: 1. ***By the right (left),*** 2. ***FILE OFF.***

The teams file off in the order of their sections, as explained in paragraph 612. The first sergeant marches the column to the stable and commands: ***FALL OUT.*** Each chief of section conducts his section to its proper place in the stable, and gives the necessary commands for dismounting the drivers, unhooking traces, and unharnessing. The drivers unharness under the supervision of their chiefs; the horses of the chiefs of section and caisson corporals are unsaddled while the drivers unharness.

As soon as the drivers have cared for their horses and harness, the first sergeant directs the senior chief of section to march them to the battery parade ground and dismiss them.

As soon as the cannoneers have cared for their carriages, the first sergeant directs the senior gunner to march them to the battery parade ground and dismiss them.

If the stable and park are too far apart for the first sergeant to superintend both the drivers and cannoneers, the captain gives such instructions as he desires.

677. In the field, when the horses are unharnessed at the carriages, the duties are performed as above described, except that the first sergeant, when directed to dismiss the battery, commands: 1. ***Drivers,*** 2. ***UNHITCH AND UNHARNESS.***

The teams are unhitched and unharnessed by the drivers under the direction of their chiefs of section, according to the methods heretofore prescribed, the horses being tied to the picket line as soon as unharnessed.

678. In horse batteries, while the drivers are unhitching the senior gunner forms the squads in column of twos, marches them to the stable and commands: ***FALL OUT.*** Each gunner conducts his squad to its place in the stable, and causes the cannoneers to unsaddle and care for their horses and equipments; he then marches his squad back to the park and causes the cannoneers to care for their carriages.

SECTION VII.—*Route marches.*

679. The section column is the habitual column of route; the distance between carriages is 2 yards, but may be increased to 4 yards when the ground is difficult.

Being in march: ***ROUTE ORDER,*** or ***AT EASE.***

Executed according to the principles already prescribed.

Sabers are returned, if drawn.

To resume the attention, the captain commands: 1. ***Battery,*** 2. ***ATTENTION.***

The captain usually marches at the head of the column, 15 yards in front of the lead horses of the leading carriage. The musicians, marching side by side, follow the captain at 2 yards distance.

The chiefs of platoon habitually march opposite the rear carriage of their platoons and superintend the march, going wherever their presence may be required.

The chiefs of section leave their posts whenever necessary to superintend the march of their sections.

The stable sergeant has charge of the reserve horses and the men assigned to their care; he ordinarily marches with them immediately behind the rear platoon.

680. In horse batteries the gunners, whenever necessary, form their squads in column of files, re-forming line as soon as the ground permits.

681. To avoid dust, the captain may direct the officers and noncommissioned officers to march on the windward side of the column. For similar reasons the cannoneers may be permitted to march on the right or left, to take advantage of a footpath, etc.

When the road is fairly good the drivers and horses may be rested by dismounting the drivers. Before going down hill and over rough parts of the road, the wheel drivers should mount without command, dismounting again when on the level or when the rough place is passed.

The cannoneers of horse batteries may also be dismounted, each cannoneer retaining hold of the reins and walking by the side of his horse.

Constant attention should be given by each officer and chief of section in order to insure the proper handling of every team and the correct adjustment of harness. They should see that each team horse does his share of the work, that no horse is overworked or overheated, that distances are preserved, and that no carriage, while in the column, moves at a different gait than that ordered. No practice is more fatiguing and injurious to horses than the alternate trotting and walking so often seen at the rear of a column.

SECTION VIII.—*Commands, signals, etc.*

Commands.

682. Commands are given by the captain either verbally, by bugle signals, or by signals made with the arm.

When verbal commands are given by the captain, they may be supplemented by the appropriate bugle or arm signals.

683. Chiefs of platoon repeat the commands of the captain, or give appropriate commands to their platoons in time to insure the proper execution of the maneuver. The chiefs of platoon ordinarily give their commands verbally, supplemented, if necessary, by the appropriate arm signal, and see to it that the commands of the captain are understood and correctly executed by their platoons. If a chief of platoon does not hear a command, he governs himself by what he sees executed by the adjoining platoon.

684. Chiefs of section repeat the commands of the chiefs of platoons, or give appropriate commands to their sections in time to insure the proper execution of the maneuver. Chiefs of section, ordinarily give their commands by signals with the arms, supplemented, if necessary, by verbal commands, and see to it that the command is understood, and that it is correctly executed.

Arm Signals.

685. Signals are ordinarily made with the right arm, but may be made with the left arm when more convenient; when made with the left arm the reins are taken temporarily in the right hand.

If the saber is in hand, the signals are made in a manner similar to that prescribed for the arm.

686. Ordinarily, before making a signal for the execution of a movement, the captain places himself where he can be seen by the battery, generally with his horse facing in the same direction as the team horses, and commands or signals the attention or causes it to be sounded on the bugle. The captain may signal the attention by blowing a long blast on a whistle.

The signals prescribed for the different maneuvers are preparatory signals; for the signal of execution, the arm is extended vertically and then lowered quickly to the side. If the movement involves a change in the direction of march, the captain moves his horse in the new direction on making the preparatory signal.

687. *Preparatory signals:*

Attention.—Extend the arm vertically and move it slowly back and forth from right to left.

Forward.—Extend the arm vertically and lower it to the front until horizontal.

By the right (left) flank.—Extend the arm vertically and lower it to the right (left) until horizontal.

Right (Left) about.—Extend the arm vertically and describe slowly a large horizontal circle with the hand; then extend the arm to the left (right) and describe a horizontal arc to front and right (left).

Countermarch.—Extend the arm vertically and describe quickly several horizontal circles with the hand.

Right sections forward.—Extend the arm vertically and then thrust several times to the front.

Right (Left) oblique.—Extend the arm obliquely upward to the right (left) and front, and then lower the arm, describing a vertical circle on the right (left) side of the horse.

To increase the gait.—Carry the hand to the shoulder, forearm vertical; extend the arm vertically from this position and repeat several times.

To decrease the gait.—Hold the arm horizontally above and in front of the forehead.

To indicate an increased or decreased gait for a maneuver, the appropriate signal is made just after the preparatory signal for the maneuver.

To halt.—Extend the arm vertically and hold it there until the signal is obeyed.

To change direction to the right (left).—Extend the arm vertically; lower it to the left (right) until horizontal and describe a horizontal arc to the front and right (left).

To close intervals.—Point to the section on which the intervals are to be closed, and then signal right (left) oblique, or left and right oblique, according as the intervals are to be closed on the right (left) section or on an interior section.

To extend intervals.—Point to the section on which intervals are to be extended, and then signal left (right) oblique, or right and left oblique, according as the intervals are to be extended on the right (left) section or on an interior section.

Right (Left) by section.—Point at the right (left) section and signal forward.

Right (Left) front into line.—Extend the arm vertically and describe several large vertical circles on the right (left) side of the horse.

Right (Left) into line.—Signal a change of direction to the right (left), followed by describing small circles with the hand while the arm is extended to the right (left).

Pieces front.—Extend the arm horizontally to the front and then move it several times through a small vertical arc.

Caissons front.—Extend the arm horizontally to the front and then move it several times through a small horizontal arc.

Flank column, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through a small horizontal arc.

Double section, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through a small vertical arc.

The signals for ***flank column,*** or ***double section, right (left) oblique,*** apply also for the formation of flank column or double section, to the right (left) after limbering.

Action front (right, left, rear).—Extend the arm vertically; then lower quickly to the front (right, left, rear), and repeat several times.

Limber front and rear.—Extend both arms laterally.

Limber rear.—Extend both arms vertically.

SECTION IX.—*Maneuvers of the battery.*

GENERAL PROVISIONS.

Guides.

688. The guide of a carriage is its lead driver; of a section in section column, the lead driver of its leading carriage; of a section in double section, the lead driver of its left carriage.

Chiefs of section supervise the gait and direction of march of their sections.

In section column, the guide of the leading section is the guide of the battery.

689. The guide of the battery in line is the guide of the right, left, or center section.

690. The guide of the battery in flank column is the guide of the leading carriage on one flank or the other.

691. During an oblique march the guide of the battery is, without indication, the guide of the leading carriage on the side toward which the oblique is made.

692. On leaving park the guidon at once posts himself with the guide of the battery. If a subsequent maneuver places the guidon at the rear of a section column, he hastens to post himself with the guide of the leading section; if with a rear carriage in line or in flank column, he hastens to post himself with the guide of the leading carriage nearest his former position, or takes the post with the indicated guide in case a guide is announced. On the formation of double section the guidon posts himself with the left carriage of the guiding section. During an oblique march the guidon does not change position.

693. With the exception just noted, the guide is habitually toward the guidon; while he is changing position, it is toward the guide with whom he is to take post.

694. The captain may announce or change the guide thus: *Guide (right, left,* or *center).*

695. If the captain desires, he may place himself in front of any carriage of the battery, and command: *Guide on me.* The carriage in rear of the captain then follows his movements and the others guide on this as the directing carriage, regulating their march and gait so as to maintain their proper relative positions. The guidon posts himself with the directing carriage.

Gaits.

696. In changes of formation, the carriages which establish the direction and rate of march of the new formation are termed *directing carriages.*

697. Reducing the gait *one degree* is to be understood as passing from the gallop to the trot, from the trot to the walk, or from the walk to the halt.

Increasing the gait *one degree* is to be understood as passing from the halt to the walk, from the walk to the trot, or from the trot to the gallop.

698. The following rules govern the gaits during changes of formation:

Movements from Column into Line, and Analogous Movements.

Rule I.—When a change of formation requires certain carriages to gain ground so as to reach specified positions abreast of the directing carriages, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing carriages maintain their gait; the other carriages move at the gait announced until they have reached their new position, when they take the gait of the directing carriages.

If the captain does not announce an increased gait, the directing carriages reduce their gait one degree; the others maintain their gait until they reach their new position, when they take the gait of the directing carriages. If the movement is executed from a halt or while marching at a walk, and an increase of gait is not ordered, the directing carriages advance three carriage lengths toward the front of the new formation and halt.

This rule applies to forming line from column, double section line from line, flank column from section column or double section column, double section column from section column or flank column, and closing or extending intervals.

Movements from Line into Column, and Analogous Movements.

Rule II.—When a change of formation requires the directing carriages to gain ground in order to precede the other carriages, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing carriages take the increased gait at once, the other carriages take it up so as to follow the movement in their proper order.

If the captain does not announce an increased gait, the directing carriages maintain their gait, the others reduce the gait one degree and take the gait of the directing carriages in time to follow the movement in their proper order. If the movement is executed from a halt, or while marching at a walk and an increase of gait is not ordered, the directing carriages move at a walk; the others remain halted, or halt and take up the gait of the directing carriages as before.

This rule applies to forming column from line, line from double section line, section column from flank column or from double section column, and passage of carriages.

To Align the Battery.

699. The battery being in line at a halt:

If the section on the side toward which the alignment is to be made is not in proper position, the captain establishes it in the position desired, and commands: 1. ***Right (Left),*** 2. ***DRESS,*** 3. ***FRONT.***

At the command ***dress*** the other carriages move forward or backward, preserving their intervals; the drivers cast their eyes to the right and dress on the drivers of the carriages established as a basis of alignment. The captain places himself on the right flank in line with the wheel driver of the base carriage, facing to the left; he quickly establishes the wheel driver of the leading carriage of the second section on the desired line, and then superintends the alignment of the other wheel drivers of the front-rank carriages. The first sergeant similarly superintends the alignment of the wheel drivers of the rear-rank carriages. The captain commands ***front*** when the alignment is complete, at which command the captain and first sergeant resume their posts and the drivers turn their eyes to the front.

700. In horse batteries, at the command ***dress*** each gun squad aligns itself toward the side ordered, under the supervision of its gunner.

To March to the Front.

701. 1. ***Forward,*** 2. ***MARCH.***

Executed simultaneously by all the carriages, as explained in The Driver.

To Halt.

702. 1. ***Battery,*** 2. ***HALT.***

Executed simultaneously by all the carriages, as explained in The Driver.

To March by the Flank.

703. 1. ***By the right (left) flank,*** 2. ***MARCH.***

Executed simultaneously by all the carriages, as explained in The Driver, the rear carriages quickly taking the track and distance from the carriages which precede them in the new formation.

704. If the battery is in line, with closed intervals, the following modifications apply: The movement is successive; the section on the indicated flank begins the movement; the others take it up in turn so as to follow, at the proper distance, in the track of the carriages which precede them. If executed while marching, all the sections except the one on the indicated flank halt, and then resume the march so as to follow in their proper places in the column.

This movement is not executed while marching at a gait faster than a walk.

To March to the Rear.

705. By an about: 1. ***Right (Left) about,*** 2. ***MARCH.***

By a countermarch: 1. ***Countermarch,*** 2. ***MARCH.***

Executed simultaneously by all the sections, as explained in The Driver.

In line or in double section line, these movements are not ordinarily executed at the gallop.

706. If the battery is in line, with closed intervals, the following modifications apply: The captain first commands: 1. ***Right sections forward,*** 2. ***MARCH.*** The right section of each platoon moves forward so as to clear the left section. If the captain orders an increased gait for the maneuver, the right sections take the gait indicated; if an increased gait is not ordered, the left sections reduce the gait one degree, or, if halted, they remain halted. As soon as the right sections are clear of the left sections, the captain gives the command for the about or the countermarch, which is executed by all the sections at the gait of the right sections. On the completion of the about or countermarch, the sections in rear increase the gait so as to reach their positions in line.

707. In horse batteries, in executing an about, if the pieces are in front, they reduce the gait slightly so as to follow the gun squads at 2 yards distance; if the caissons are in front, they increase the gait slightly on completing the about, so as to follow the pieces at 2 yards distance.

To March Obliquely.

708. 1. ***Right (Left) oblique,*** 2. ***MARCH.***

Executed simultaneously by all the carriages, as explained in The Driver. The carriages move in parallel lines. The lead drivers align themselves in each rank of carriages; the lead driver of each rear rank carriage also aligns himself upon the lead driver of the carriage corresponding to his own in the front rank. If these positions are properly maintained, the carriages should, on executing a second oblique in either direction, have the proper distances, intervals, and alignment.

To Change Direction.

709. Being in section column or in flank column: 1. ***Column right (left)***, 2. ***MARCH.***

The leading section wheels to the right, as explained in The Driver; the sections in rear follow the leading section and wheel on the same ground.

Column half right (half left) is similarly executed.

710. Being in line: 1. ***Battery right (left) wheel***, 2. ***MARCH.***

The pivot section wheels to the right, as explained in The Driver. The other sections increase the gait one degree, preserving their intervals from the pivot section, and take the gait of the latter on arriving abreast of it.

If executed while marching at the gallop, the sections other than the pivot section increase the gait without urging their horses too much.

Battery right half (left half) wheel is similarly executed.

To Execute a Passage of Carriages.

711. Being in line or in column of sections, to place the rear carriages in front: 1. ***Pieces (Caissons) front***, 2. ***MARCH.***

Executed simultaneously by all the sections, as prescribed in The Driver.

Rule II governs the gaits.

To Close or Extend Intervals in Line.

712. 1. ***On (such) section***, 2. ***Close (Extend) intervals***, 3. ***MARCH.***

The normal closed interval is 8 yards; the normal extended interval is 17 yards. If the captain desires greater or less intervals to be taken, he announces the interval before giving the second command; for example: 1. ***On first section***, 2. ***To 20 yards***, 3. ***Extend intervals***, 4. ***MARCH.***

The indicated section moves straight to the front; the other sections incline toward or away from the indicated section and move to the front when at the proper interval.

Rule I governs the gaits.

To Form Section Column to the Front from Line.

713. 1. ***Right (Left) by section,*** 2. ***MARCH.***

The right section moves straight to the front. The other sections in turn, wheel to the right and follow in the column at 2 yards distance.

Rule II governs the gaits.

To Form Line from Section Column.

714. *To the front:* 1. ***Right (Left) front into line,*** 2. ***MARCH.***

The leading section moves straight to the front. Each section in rear obliques to the right until opposite its place in line, when it obliques to the left, moves to the front, and takes its place on the line.

Rule I governs the gaits.

715. To the right (left): 1. ***Right (Left) into line,*** 2. ***MARCH.***

The leading section executes a right wheel, and then moves straight to the front. The other sections move forward and successively wheel to the right. when by so doing they will be opposite their positions in line; they then move to the front and take their places on the line, to the right of the carriages which preceded them.

If, in the execution of the movement, the sections in rear move at a faster gait than the leading section, the second section in the column inclines to the right sufficiently to clear the leading section.

Rule I governs the gaits.

716. On the right (left): 1. ***On right (left) into line,*** 2. ***MARCH.***

Executed as prescribed for ***right into line,*** except that the second section in the column inclines to the ***left*** in order to clear the leading section. and that each section passes beyond the preceding one before wheeling to the right; also that the leading section is habitually halted on advancing three carriage lengths after the completion of its wheel.

717. To form line at closed intervals, the captain commands: ***At (so many) yards intervals,*** before giving the prescribed commands for forming line; the battery is then formed with the intervals prescribed.

To Form Flank Column from Section Column.

718. 1. ***Flank column,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***
The rear carriages of all the sections oblique to the right simultaneously, and then oblique to the left, when by so doing they will have an interval of 17 yards from the leading carriages. The carriages of each rear section close upon the carriages which precede them in the column, at the gait of the carriages which oblique.

Rule I governs the gaits.

To Form Line to the Front from Flank Column.

719. 1. ***Right (Left) front into line,*** 2. ***MARCH.***
The carriages on the right of the column execute ***right front into line,*** as prescribed for a section column. The carriages on the left move by the right flank, and each forms in section column behind the right carriage of its own section.

Rule I governs the gaits.

To Form Section Column from Flank Column.

720. 1. ***Pieces (Caissons) front,*** 2. ***MARCH.***
Executed successively by each section, as prescribed in The Driver; each section in rear times its movement so as to follow in the track of the preceding section at proper distance.

Rule II governs the gaits.

To Form Double Section and to Resume the Previous Order.

721. Being in line or in section column: 1. ***Double section,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***
Executed simultaneously by all the sections, as explained in The Driver; the rear sections, when in section column, close up at the gait of the carriages which oblique.

Rule I governs the gaits.

722. To resume the previous order: 1. ***Pieces (Caissons) front,*** 2. ***MARCH.***
Executed by each section as explained in The Driver. The movement is simultaneous when executed from double section line; successive, when executed from double section column.

Rule II governs the gaits.

723. Being in flank column: 1. ***Double section,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

Executed simultaneously by all the sections as explained in The Driver.

Rule I governs the gaits.

724. To resume the previous order: 1. ***Flank column,*** 2. ***Right (Left) oblique,*** 3. ***MARCH.***

Executed simultaneously by all the sections as explained in The Driver.

Rule I governs the gaits.

725. The double section line or column is maneuvered as explained for the normal order in line or in section column, with the exceptions made necessary by the difference of formation. The carriages retain their relative order until they are again formed in the normal order in line, in section column, or in flank column. The posts of individuals are analogous to those prescribed for the order in line or column.

Passage of Obstacles.

726. If, while maneuvering or marching, an obstacle is encountered by any subdivision, its chief, without waiting for orders, gives appropriate commands for avoiding the obstacle and for resuming the original formation as soon as the obstacle is passed.

SECTION X.—*To subdivide the battery for action.*

727. Before unlimbering the guns for action, the battery on a war footing is subdivided into firing battery, combat train, and field train (par. 649). The battery of maneuver is subdivided into the firing battery and the combat train; in this case the firing battery consists of the first five sections of the battery; the combat train of the sixth section.

728. To subdivide the battery and prepare it for action, the captain commands: ***FORM AND PREPARE FOR ACTION.***

The carriages of the firing battery are at once prepared for action, as explained in paragraph 220. Each chief of platoon inspects his unit and reports to the captain whether or not all parts of the matériel are in working order. The reconnoissance officer, the combat-train commander, and the field-train commander, if present, report to the captain for instructions.

The subdivision is ordinarily effected in rear of the position to be occupied. If the guns have to be moved a considerable distance or over rough ground to reach the position, the panoramic sights and range quadrants are replaced in their cases, and are again placed in their seats when the position is reached. As the guns are moved forward to their position, the combat-train commander posts the combat train under cover in the general locality indicated by the captain; the quartermaster sergeant similarly posts the field train, if that train is present.

The first caisson of the fifth section is habitually unlimbered on the right of the line of guns, the second caisson on the left. Depending upon the nature of the ground and the circumstance of the case, the fifth section may either follow the remainder of the battery toward the position for action and take post under the direction of its chief in the most convenient manner; or, at the subdivision for action, the caissons may take post on the proper flanks of the battery, accompany it to the position, and unlimber simultaneously with the guns. In the absence of special instructions from the captain the chief of the fifth section adopts the measures best suited to the immediate case. One or both caissons may be unlimbered in rear of the line under cover, depending upon the nature of the ground and the character of the action. If practicable, the captain uses the caisson on the windward flank as his observing station.

729. If, for any reason, it is desired to subdivide the battery without preparing for action, the captain commands: ***FORM FOR ACTION.*** In this case the battery is subdivided, as prescribed above, but the carriages of the firing battery are not prepared for action.

730. During the elementary instruction of the battery in fire discipline, the captain may require the chief of the third platoon to drill his platoon in the exercises of the platoon mounted.

SECTION XI.—*To form in battery and to resume a marching formation.*

General Provisions.

731. The double section line and the double section column are the habitual formations preliminary to taking the order in battery. The double section line is adapted to unlimbering for action either to the front or the rear; the double section column, to unlimbering for action to the flank. By suitable maneuvers the battery is placed on the desired ground in the appropriate formation before the commands for unlimbering are given.

732. When unlimbering to fire projectiles, or for the practice of fire discipline, the captain and the chiefs of platoon and section dismount. The captain's horse is held under cover near the position of the battery by one of the musicians. Each chief of platoon passes the reins of his horse to the swing driver of his nearest caisson, when the caissons are on the left; to the lead driver of his nearest piece, when the pieces are on the left; each chief of section passes his reins to the swing driver of his piece; these horses are led off with the limbers, and are returned in like manner on limbering after action.

The first sergeant, musicians, orderlies, etc., habitually dismount when their duties require them to remain with the firing battery. The first sergeant sees that such horses are held under cover.

733. In horse batteries, the cannoneers, except horse holders, dismount at the command ***Action front (rear,*** etc.), link their horses and run to the carriages. The horse holders follow the limbers and post the led horses in rear of the caisson limbers.

734. In active service and in instruction simulating it, the limbers are habitually placed under cover in the vicinity of the guns, and generally on the flank. At ceremonies the limbers are placed in rear of their carriages, as prescribed in paragraphs 223, 224, and 225. If the captain desires the limbers to be posted under cover, he indicates, before giving the commands for unlimbering, the position they are to take.

735. When posted elsewhere than in rear of the guns, the limbers are formed so as to take the best advantage of cover, generally in double section line faced toward the enemy, and with intervals of about 10 yards between limbers of adjacent sections. If unlimbered from line, the limbers of each section execute a left about as prescribed in paragraph 223, and move straight to the rear; if from column, they wheel toward the rear of the position. After thus clearing the front of the position, they form in double section column at the command or signal of the first sergeant and are conducted by him to the place designated by the captain, where they are formed right or left into line, as the case may be. If the position is to be occupied for a considerable time, the first sergeant dismounts the drivers, allows them to stand at rest, puts the senior caisson corporal present in charge, and returns to the position of the guns.

736. If the limbers are posted on the flank of the battery, at the command or signal for limbering, they file off from the flank nearest the battery and move in section column toward it; on approaching the position, the piece and caisson limbers separate and form in two columns, each column being directed toward the trails of the corresponding carriages.

As soon as the fifth section caissons are limbered, the chief of this section assembles his section on the proper flank of the battery and in a formation similar to that of the remaining sections of the battery.

737. In unlimbering, the limbers habitually move to their posts at a trot. In limbering, they move at a walk, unless an increased gait is ordered.

738. After unlimbering, the guns and caissons are habitually aligned toward the right.

To Fire to the Front.

739. Being in double section line, the caissons on the left of their pieces: ***ACTION FRONT.***

Executed as prescribed in paragraph 223.

To Fire to the Rear.

740. Being in double section line, the caissons on the right of their pieces: ***ACTION REAR.***

Executed as prescribed in paragraph 224.

To Fire to the Flank.

741. Being in double section column, the caissons on either flank of their pieces: ***ACTION RIGHT (LEFT).***

Executed as prescribed in paragraph 225.

To Limber to the Front and Rear, and to March.

742. 1. *Limber,* 2. ***FRONT AND REAR.***

Executed as prescribed in paragraph 228.

After limbering to the front and rear, the teams of each section face in opposite directions.

743. *To march in line:* 1. *Pieces (Caissons) front,* 2. ***MARCH.***

The carriages designated move straight to their front; the others execute a right about and quicken the gait so as to follow in section column the carriages of their own sections which precede in the movement.

744. *To march in column to the flank:* 1. *Flank column,* 2. *Pieces by the right (left) flank,* 3. ***MARCH;*** or, 1. *Double section,* 2. *Pieces by the right (left) flank,* 3. ***MARCH.***

All the carriages move by the flank in the indicated direction, the caissons so regulating the gait as to place themselves abreast of their pieces in flank column or double sections, as the case may be.

To Limber to the Rear, and to March.

745. 1. *Limber,* 2. ***REAR.***

Executed as prescribed in paragraph 229.

After limbering to the rear, the teams all face in the same direction.

746. To march in line: 1. *Pieces (Caissons) front,* 2. ***MARCH.***

The carriages designated move straight to the front; the others follow their proper carriages in section column.

747. *To march in column to the flank:* 1. *Flank column,* 2. *Pieces by the right (left) flank,* 3. ***MARCH,*** or, 1. *Double section,* 2. *Pieces by the right (left) flank,* 3. ***MARCH.***

All the carriages move by the flank in the indicated direction, the caissons so regulating the gait as to place themselves abreast of their pieces in flank column or in double section, as the case may be.

To Form Double Section Line After Limbering.

748. 1. *Form double section line,* 2. ***MARCH.***

If the battery has been limbered front and rear, the caissons stand fast; each piece inclines to the right, executes a left about, and places itself in double section on the right of its caisson.

If the battery has been limbered rear, the pieces stand fast and each caisson moves up and places itself in double section on the right of its piece.

CHAPTER V.—THE BATTALION MOUNTED.

SECTION I.—*Organization of the battalion.*

749. A battalion of field artillery consists of three batteries of field artillery and of the authorized staff and noncommissioned staff. It is ordinarily commanded by a major.

The field, staff, noncommissioned staff, etc., of a battalion are as follows:

PEACE FOOTING.

Personnel.	No.	Remarks.
Major	1	Commands battalion.
Captain	1	Adjutant and reconnaissance officer.
Lieutenant	1	Quartermaster and commissary.
Sergeant major	1	Assistant to adjutant and reconnaissance officer (m).
Quartermaster sergeant	1	Assistant to quartermaster and commissary (m).
Mounted orderlies	2	Orderlies and horse holders (m).
Corporals	4	Detailed, 1 as signaler and telephone operator at battalion headquarters (m), 3 as artillery scouts (m).
Musician	1	Detailed, musician for battalion commander (m).
Privates	6	Detailed, 3 as artillery scouts (m), 1 as assistant to signaler corporal (m), 2 as drivers for reel cart.

WAR FOOTING.

Major	1	Commands battalion.
Captain	1	Adjutant and reconnaissance officer.
Lieutenant	1	Quartermaster and commissary.
Sergeant major	1	Assistant to adjutant and reconnaissance officer (m).
Quartermaster sergeant	1	Assistant to quartermaster and commissary (m).
Mounted orderlies	2	Orderlies and horse holders (m).
Corporals	7	Detailed, 3 as agents (m), 1 as signaler and telephone operator at battalion headquarters (m), 3 as artillery scouts (m).
Privates	8	Detailed, 3 as artillery scouts (m), 1 as assistant to signaler corporal (m), 1 as musician and mounted orderly (m), 2 as drivers for reel cart, 1 as wagoner.

SECTION II.—*Formations of the battalion.*

750. The normal formations of the battalion are: The ***order in line***, the ***order in section column***, the ***order in flank column***, and the ***order in battery***.

The individual batteries are formed in each case as heretofore prescribed (pars. 655–662); and, in each case, the formation of the battalion is analogous thereto.

751. In the normal order, the interval between batteries in line or in battery is twice the interval between the sections of the batteries. The distance between batteries in section column or flank column is carriage length.

752. If the battalion is formed in column, with its batteries each formed in the order in line, the formation is termed a ***column of batteries***. The distance between the batteries is equal to the battery front, when at full distance; it is carriage length when at closed distance. When the battalion is in column of batteries at closed distances it is said to be ***closed in mass***.

753. If the battalion is formed in line with its batteries each formed in the order in section column, or the order in flank column, the formation is termed a ***line of section columns***, or ***a line of flank columns***. Full interval, in this case, is such as would result if the batteries had executed a simultaneous change of direction to the right or left from a formation of the battalion in the order in section column or the order in flank column; closed interval is carriage length or such as the major may prescribe.

754. At formations of the battalion, batteries habitually take their places from right to left in line, from front to rear in column, in the order of rank of their captains.

Batteries whose captains are absent take their places in line or column according to the relative rank of the officers present in command of them. A battery whose captain is absent for a few days only retains its place, according to the rank of the captain, unless otherwise ordered by the major.

After the formation of the battalion no cognizance is taken of the relative order of the batteries. On marches the major ordinarily varies from day to day the relative order of the batteries in column.

SECTION III.—*Posts of individuals.*

755. At ceremonies the major is opposite the center and 30 yards in front of the line of captains if in line, or in front of the captain of the leading battery if in column. On other occasions he places himself where he can most readily observe and direct his battalion. The commissioned staff is posted two yards in rear of the major in order of rank from right to left. The sergeant major, the quartermaster sergeant, the noncommissioned agents and scouts, and the signaler when the battalion reel cart is not present, are formed in line in the order given from right to left, two yards in rear of the commissioned staff. The musician, the mounted orderlies, and the privates of the headquarters detachment, in the order named from right to left, are in line two yards in rear of the noncommissioned officers. The agents and scouts when detailed from batteries are in the order of the alphabetical designations of their batteries from right to left. The battalion reel cart is posted 10 yards to the left of and with the heads of the lead horses in line with those of the noncommissioned officers. The corporal signaler is boot to boot with the lead driver. The private is abreast of and two yards outside of the left rear wheel of the cart.

Whenever the maintenance of a close formation would be unduly conspicuous or dangerous, as, for example, in approaching a position for reconnaissance, the staff, agents, etc., of a commanding officer do not retain their prescribed posts; they are required to dispose themselves so as to secure the proper performance of their duties, together with the greatest amount of concealment possible.

SECTION IV.—*To form the battalion.*

756. To form the battalion in line, the adjutant causes adjutant's call to be sounded; the adjutant and sergeant major proceed to the selected ground and post themselves facing each other a few yards outside the points where the right and left of the right battery of the battalion are to rest.

The batteries approach the line from the rear and are posted in succession from right to left by their captains, so that the heads of the lead horses will be on the line established by the adjutant and sergeant major. After halting his battery, each captain aligns it toward the right, as prescribed in paragraph 759.

When the battery that arrives first on the line has been established, the sergeant major joins the battalion noncommissioned staff.

The line being formed, the major and his staff take post facing the center of the battalion. The adjutant then moves at a trot or gallop by the shortest line to a point midway between the major and the center of the battalion, halts, facing the major, salutes with the right hand, and reports: ***Sir, the battalion is formed.***

The major returns the salute with the right hand.

The adjutant then takes his post with the battalion staff.

757. The battalion may also be assembled in any other convenient formation. In such cases, as soon as the last battery has taken its place, the adjutant joins the major and reports to him that the battalion is formed.

758. Officers draw and return saber with the major. At ceremonies, sabers are habitually drawn; at other times, they are drawn or kept in the scabbard at the discretion of the major.

759. ***To align the battalion.***—To effect a general alignment the major causes one of the flank batteries to be established in the desired position, and commands: 1. ***By battery;*** 2. ***Right (Left);*** 3. ***DRESS.***

Each captain, in turn, commencing with the battery first posted, aligns his battery (par. 699) toward the flank designated, and commands ***Front*** when the alignment is complete.

The captain and first sergeant of the battery first established superintend the alignment from the flank of their battery nearest the point of rest. The captain and first sergeant of the other batteries superintend the alignment from the flank of their battery farthest from the point of rest.

760. ***To dismiss the battalion.***—The major commands: ***Dismiss your batteries,*** or sends appropriate instructions to the captains. Each captain marches his battery to its park and dismisses it.

SECTION V.—*Maneuvers of the battalion.*

761. To reach the position for action at the proper time and to occupy it skillfully are the objects to be aimed at in training in maneuver.

The actual occupation of the position is not, as a rule, effected by a formal maneuver of the battalion as such, but rather by the separate movement of the individual batteries to the positions assigned them, to the end that all possible advantage may be taken of the cover and concealment afforded by the ground.

Formal maneuvers of the battalion, as such, are consequently of limited application.

For passing from one formation to another, and for the simple evolutions requisite for ceremonies and the ordinary incidents of service, the battalion is maneuvered in accordance with the principles heretofore prescribed for a single battery and by similar commands. In the case of simultaneous movements, such as marching to the front, to the flank, to the rear, obliquely, etc., the command or signal of execution of the major is immediately repeated by the captains and simultaneously executed by the batteries. In the case of successive movements, the captains maneuver their batteries so as to cause them to arrive at their proper positions by the shortest route and in conformity with the principles of the rules of gaits (par. 698).

762. The commands of the major are transmitted by couriers, or given by arm, saber, or bugle signals, or by word of mouth. The captains habitually repeat the commands of the major, or give such commands as may be necessary to insure the execution of the movement. Their commands are given by arm or saber signal, or by word of mouth. The whistle, and not the bugle, is habitually used to attract attention to the signals of the captain during the evolutions of the battalion.

CHAPTER VI.—THE REGIMENT MOUNTED.

SECTION I.—*Organization of the regiment.*

763. A regiment of field artillery consists of two battalions, and of the authorized staff, noncommissioned staff, and band. It is commanded by a colonel.

The field, staff, noncommissioned staff, etc., of a regiment are as follows:

PEACE FOOTING.

Personnel.	No.	Remarks.
Colonel	1	Commands regiment.
Lieutenant colonel	1	Such duties as may be assigned him by the colonel.
Captains	3	1 as adjutant and reconnaissance officer, 1 as quartermaster, 1 as commissary.
Chaplain	1	
Veterinarians	2	
Sergeant major	1	Assistant to adjutant and reconnaissance officer (m).
Quartermaster sergeant	1	Assistant to quartermaster (m).
Commissary sergeant	1	Assistant to commissary (m).
Color sergeants	2	(m).
Mounted orderlies	5	Orderlies and horse holders (m).
Sergeants	2	Detailed, 1 in charge of scouts (m), 1 as signaler and telephone operator at regimental headquarters (m).
Musician	1	Detailed, orderly and musician for regimental commander (m).
Privates	8	Detailed, 3 as artillery scouts (m), 1 as assistant to signaler sergeant (m), 1 as horseshoer (m), 1 as saddler (m), 2 as drivers for reel cart.

WAR FOOTING.

Personnel.	No.	Remarks.
Colonel	1	Commands regiment.
Lieutenant colonel	1	Such duties as may be assigned him by the colonel.
Captains	3	1 as adjutant and reconnaissance officer, 1 as quartermaster, 1 as commissary.
Chaplain	1	
Veterinarians	2	
Sergeant major	1	Assistant to adjutant and reconnaissance officer (m).
Quartermaster sergeant	1	Assistant to quartermaster (m).
Commissary sergeant	1	Assistant to commissary (m).
Color sergeants	2	(m).
Mounted orderlies	5	Orderlies and horse holders (m).
Sergeants	5	Detailed, 1 as trumpeter sergeant (m), 1 as signaler and telephone operator at regimental headquarters (m), 2 as agents (m), 1 in charge of artillery scouts (m).
Corporals	2	Detailed, artillery scouts (m).
Privates	11	Detailed, 3 as artillery scouts (m), 2 as horseshoers (m), 1 as farrier (m), 1 as saddler (m), 1 as assistant to signaler sergeant, 2 as drivers for reel cart, 1 as wagoner.

SECTION II.—*Formations of the Regiment.*

764. The formations of the regiment are similar to those of the battalion, the intervals and distances between battalions being normally twice those between batteries.

765. If the regiment is formed in line with its battalions each in column of batteries closed in mass, the formation is termed a *line of masses.* The normal interval between battalions in this case is two carriage lengths.

766. At formations of the regiment, battalions normally take their places from right to left in line, from front to rear in column, in the order of rank of the battalion commanders.

Battalions, whose permanent commanders are absent, take their places in line or column according to the relative rank of the officers present in command of them. A battalion whose permanent commander is absent for a few days only retains its usual place unless otherwise ordered by the regimental commander.

After the formation of the regiment no cognizance is taken of the relative order of the battalions.

SECTION III.—*Posts of Individuals.*

767. At ceremonies the colonel is 60 yards in front of his regiment, opposite the center. On other occasions he is where he can best observe and direct his regiment.

The lieutenant colonel is on the right of the commissioned staff; during field movements and on the march he is not restricted to any particular post; the commissioned staff is 2 yards in rear of the colonel, adjutant on the right, the others in order of rank from right to left.

The noncommissioned staff, the headquarters detachment, musician, mounted orderlies, and reel cart (when present) are posted as prescribed in paragraph 755.

SECTION IV.—*To form the regiment.*

768. The battalion commanders are notified as to the time, place, and order of formation of the regiment. Each forms his battalion at the time and place designated, and in the order prescribed.

For line formations the adjutant indicates to the major of the first battalion the point of rest and the line on which the regiment is to be established; he then takes post about 30 yards in front of the center of the regiment.

The line being formed, the colonel, the lieutenant colonel, staff, etc., take post facing the center of the regiment.

The adjutant then brings the regiment to attention, if not already at attention, faces the colonel, salutes, and reports: ***Sir, the regiment is formed;*** the colonel returns the salute with the right hand. The adjutant then takes post with the regimental staff.

The regiment may also be formed in any other convenient formation; in such cases, as soon as the last battalion has taken its place the adjutant joins the colonel and reports to him that the regiment is formed.

SECTION V.—*Maneuvers of the regiment.*

769. The colonel causes his commands to be transmitted to the battalion commanders, and the latter maneuver their battalions according to the principles heretofore prescribed, so as to place them in the desired formation at the proper time and place.

The commands of the colonel may be given by bugle, arm signals, or voice, but as a rule they are conveyed by couriers.

PART V.

FIELD ARTILLERY INFORMATION SERVICE.

CHAPTER I.—DUTIES AND PERSONNEL.

770. The functions of this service are: (1) To secure information which will favor the movement and employment of the guns; (2) to maintain communication between the various commanders concerned; (3) to provide for the security of the field artillery when such security is not provided for by the other arms.

Information is usually secured by reconnaissance officers and scouts. Communication is usually maintained by agents acting as couriers or by signalers, using visual signals or the telephone. The duties of the two classes are apt to merge into each other and no sharp line of distinction can be drawn between the duties to be performed by the different individuals.

771. The probable movement of guns and probable occasions for their employment should, so far as possible, be foreseen and special information secured beforehand to facilitate such movement or employment. Thus, on first approaching the scene of expected action, reconnaissance officers and scouts should be pushed well ahead to examine the terrain and to gain early touch with the tatical situation. They should thus be prepared to furnish the field artillery commander with information which will assist him in making recommendations as to the posting of the artillery. After the positions are selected the reconnaissance officers and scouts should secure further detailed information—such as firing data, appropriate routes for approaching and occupying the selected positions, etc.—and should be prepared to guide battalions and batteries to their appointed positions. During the progress of the action this personnel is employed to prepare for further movements; to examine positions likely, under certain contingencies, to be occupied; to act as auxiliary observers, reporting on movements of the enemy or of our own troops, and on changes necessary in the adjustment of fire; to maintain communication between the field artillery and infantry commanders, etc.

772. Communication must be maintained: (*a*) Between the superior commander and the field artillery commander; (*b*) between the field artillery and the infantry which it is immediately assisting; (*c*) between the elements of the field artillery itself.

(*a*) As a rule, the field artillery commander accompanies the commander of the troops during the earlier stages of an engagement and receives the orders of such superior commander in person. As the engagement progresses it may be necessary for the field artillery commander to establish his position at a point other than that selected as the position of the commander of the troops. In such cases the duty of maintaining communication between the superior commander and the field artillery commander devolves, in general, upon the signal corps. If, however, the signal corps is for any reason unable to supply such communication, the field artillery commander furnishes the personnel and matériel necessary to maintain connection with the superior commander. In any case, the field artillery commander is represented at the headquarters of the superior commander by an agent designated from among the field artillery personnel for the purpose.

(*b*) When a given force of field artillery is told off to render close support to a given force of infantry in accomplishing a definite purpose, the artillery commander should be informed as to the plan of the infantry commander, and the two commanders should arrange by conference beforehand as to the means of communications, methods, etc., to be used to insure close cooperation. To insure effective cooperation it is essential that the field artillery be kept informed as to the losses sustained by the infantry, the particular part of the hostile line from which the fire causing the greatest losses comes, the movements and any change of plan of our infantry, also as to when it is necessary to begin, increase the rate of, or cease firing. An artillery reconnaissance officer with artillery scouts, or artillery scouts alone, may be employed to establish the requisite means of communication, which may be by courier, signals, or telephone. The reconnaissance officer and scouts also report on the effect of the field artillery fire and furnish such other technical data as they may be able to obtain. It may frequently be necessary for the infantry to furnish additional means of communication. Especially is this necessary during the last moments of an assault, when previously concerted signals for the cessation or shifting of field artillery fire must, as a rule, be given from the infantry firing line.

(*c*) Communication between the various elements of the field artillery is maintained by members of the headquarters detachments and of the battery details.

773. The personnel assigned regimental and battalion headquarters, on a peace and on a war footing, for the performance of the duty of information and communication is shown in paragraphs 749 and 763. In time of peace agents are not permanently detailed at regimental and battalion headquarters. The agents are, however, designated in time of peace, and, while ordinarily remaining on duty with their respective batteries, report to the regimental or battalion commander for instruction.

In each battery two corporals are trained as battery scouts and one corporal and two privates are trained as battery signalers.

At each field artillery brigade headquarters, the brigade adjutant acts as reconnaissance officer and the two aides-de-camp as agents.

774. In general, commanders of field artillery brigades, regiments, and battalions employ the members of their own headquarters detachments for securing the information required at the particular headquarters, and for transmitting information and orders to the next lower commanders. When necessary, however, brigade and regimental commanders call upon the next lower units for details to assist in securing information or in transmitting information and orders. Thus, when extensive reconnaissance is necessary for obtaining information upon which to base his recommendations for the preliminary deployment of the field artillery, the brigade commander may call for details of reconnaissance officers and scouts, to be employed under the immediate direction of the brigade reconnaissance officer. When such a reconnaissance has been made, the employment of the guns is usually facilitated by assigning organizations to positions which have been covered during the preliminary reconnaissance by the officers and scouts detailed from the particular organizations.

775. The exact manner in which a headquarters detachment should be employed depends upon circumstances. To meet the requirements of the average case the members of the detachment are assigned normal duties in accordance with the individual aptitudes of the men; but each man, including mounted orderlies, saddlers, etc., should be so instructed as to be available at any time to assist in the duty which is then most important.

No men are permanently detailed for the sole duty of paying out the wire from the reel cart or for guarding the line, but men for these purposes are detailed from among the personnel available at the time.

Regimental and battalion sergeants major, as assistants to reconnaissance officers, should be experts in all the duties involved.

776. Two corporals in each battery are trained as battery scouts. These corporals should be chosen from the caisson corporals belonging to the firing battery.

The special function of the battery scouts is to act as ground scouts, in selecting the best routes for expected movements, and for guiding the battery along such routes. Battery scouts are also utilized as auxiliary observers.

As a rule the battery acts as a part of a battalion, and all scout duty is, so far as practicable, performed by the battalion scouts; the battery scouts should, however, be thoroughly trained not only as scouts, but also as agents, signalers, and in the use of the telephone.

777. In each headquarters detachment the men employed on the less important duties are the substitutes for the more important positions, the vacancies in less important positions being filled by men selected from the batteries.

In each battery a substitute is designated for each battery signaler and for each scout. Substitutes are thoroughly instructed in the duties prescribed for their principals.

Each headquarters detachment is instructed by its adjutant; the battery scouts and signalers by the battery commander.

Battalion and regimental commanders give such instructions and exercise such supervision as may be necessary to insure proper training and the development of uniform methods in signaling and in telephoning.

During the period devoted to battery instruction the battery signalers should be frequently assembled for practicing intra-battalion or intra-regimental communication. Advantage must be taken of terrain exercises without troops, and of all battalion and regimental exercises, to train and develop the entire personnel pertaining to the information service.

CHAPTER II.—SCOUTS.

SECTION I.—*Duties of scouts.*

778. To secure information which will facilitate the movement and the employment of artillery is the special function of artillery scouts.

The movement of artillery is facilitated, for example, by determining the practicability of a given route; by exploring a section of country and selecting the best routes for traversing it; by locating any bodies of the enemy which might obstruct the movement, etc.

The employment of artillery, is facilitated, for example, by determining the dispositions of the enemy, the dispositions of our own troops, and such changes in these dispositions as may occur from time to time during the progress of an action; by observing the effect of our fire, and indicating, if necessary, corrections which will insure its proper adjustment; by reporting the arrival of hostile parties within dangerous proximity of the artillery position, etc.

The special functions of scouts are, then, to reconnoiter, to observe, to report.

779. On minor duties scouts may operate singly. Ordinarily, however, they operate in pairs, one devoting his special attention to gaining the desired information, the other looking out for safety, keeping track of the route followed, and watching for signals from the main position or from neighboring scouts. In especially important cases a patrol consisting of several scouts under a reconnaissance officer is employed.

Scouts operate according to the rules laid down for patrols (see Field Service Regulations, par. 47 et seq.), so far as these rules are applicable to their more restricted functions. When sent on a duty they are to be given explicit instructions as to the information required, as to the place for reporting, and as to the time available for securing the desired information. Full latitude is to be allowed them in the choice of ways and means to carry out the duties imposed.

780. The nature of the duties to be performed by scouts is indicated below:

1. In reconnoitering a designated road the scout prepares himself to report especially upon: Its general practicability for artillery; pioneer work needed, if any; condition of the road as

affecting rate of march; strength of bridges; the existence of defiles on the road, such as causeways, bridges, narrow valleys, etc.; practicability in general of leaving the road and moving across adjacent country; existence of intersecting roads, with direction and destination.

2. In selecting a route to a given point the scout endeavors first to get a good view of the terrain. If no road exists in the desired direction, he studies the lay of the ground and judges where the most practicable route will be. If possible, he selects certain landmarks on the proposed route, from which good views can apparently be obtained, and proceeds rapidly from one to another, studying the country as he moves. Having determined a practicable line of advance to the given point, he may make more detailed investigations as he returns.

When the advance to an artillery position is in question, it is especially desirable that scouts should examine all the ground in the neighborhood of the position, so as to be able to lead officers or batteries quickly to any part of it.

3. In reconnoitering a route, scouts must be especially careful to note landmarks, to turn frequently and look at the country which they have passed, and to take such other measures as will enable them to surely retrace their steps either by day or night. Practice in moving at night is particularly important for scouts.

4. When sent to examine a place in which an enemy may be concealed—for example, a wood, a defile, a village—scouts first examine its approaches, its edges, and, if possible, its exits; they endeavor to reach a position from which they can overlook it; ordinarily, one scout or one party should observe, while another passes through the suspected place.

If preceding the column by only a short distance, scouts must act with great promptness.

5. When the information at hand as to the location and disposition of the enemy is insufficient, scouts may be pushed forward to secure this information, both by personal reconnaissance and by communicating with our own advanced troops. In such cases they should fix in their minds the lay of the ground near the enemy's positions, noting such landmarks and making such sketches as will enable them to give a clear description of his situation. Similar information should at the same time be secured with regard to our own troops.

6. During an action, when observation of fire or of the terrain is difficult, parties of scouts may be sent to occupy positions from which they can keep their commander continually informed as to the efficacy of the fire and as to changing conditions in the field of action. Thus they should be able to verify the presence of the enemy in a certain locality and report his situation and dispositions with reference to certain landmarks: to report the arrival of bodies of the enemy in a given position or their departure therefrom; to report the positions occupied by our own troops, the possibility of firing over them with safety, and special ways in which the guns may be of assistance to them; to report whether or not our fire is properly adjusted, indicating such corrections as may be necessary.

7. As a general principle, field artillery in position is safeguarded by troops of the other arms; but when posted in exposed positions, as, for example, on the flank of a line, it is incumbent upon the artillery commander, as an additional precaution, to post scouts where they may, by suitable signals, give timely warning of the approach of hostile parties.

8. The information secured by a single scout is ordinarily communicated by a verbal report. In the case of a patrol, however, it is often advisable for the patrol commander to send concise written reports, giving important information as it is secured. These reports should be supplemented by a sketch on which is indicated the important information secured. A route sketch should be on a scale of 3 inches to the mile. A panoramic sketch of the enemy's position should show angular distances in mils between important points. The point from which the sketch was made should be clearly stated and should, if practicable, be indicated on the route sketch.

Scouts acting as auxiliary observers during an action report, if possible, by telephone; otherwise, by signals with flag, heliograph, or lantern.

In communicating with each other for the purpose of indicating a change in the direction of march scouts employ the signals prescribed in these regulations. The whistle or the arm signal is used for attracting attention.

To indicate danger, enemy in sight, both arms are raised vertically. The arms are raised and lowered energetically several times if the danger is imminent.

SECTION II.—*Training of scouts.*

781. For scout duty, alert, cool-headed and intelligent men should be selected; they should be good horsemen and have good eyesight and good hearing.

Each scout should be provided with a good field glass or telescope, a compass, a watch, a whistle, a pocket message and sketch book, and a pencil.

782. The training of a scout should have for its object:

1. To develop his powers of observation.
2. To teach him what to look for and how to recognize it.
3. To teach him how to report intelligently and concisely.

The scout's powers of observation and description are developed first of all by simple exercises. Thus he may be required to look at a given section of terrain and describe what he sees in it.

The scout is made to appreciate the lay of the land as indicated primarily by its water system, and secondarily by other natural features, and by the works of man. A good eye for country is thus to be acquired; the scout learns to appreciate the configuration of a terrain which may be only partially visible to him, and thus deduce the most favorable routes for traversing it and the most probable positions for hostile occupation.

The scout must also be taught to distinguish troops of the different arms, to recognize their formations, and to familiarize himself with their usual methods of action.

The scout must be trained (*a*) to use field glasses; (*b*) to read maps; (*c*) to make reports, both verbal and written; (*d*) to make route sketches; (*e*) to make panoramic sketches of positions.

CHAPTER III.—AGENTS OF COMMUNICATION AND ROUTE MARKERS.

783. The special function of agents is to transmit information and orders.

The special function of route markers is to indicate to parties or organizations the route which they are to follow.

SECTION I.—*Agents.*

784. Agents are employed to keep a commander in touch with the elements of his command. In addition to acting as mediums of written or oral communication between the commander and the elements concerned, agents keep the commander informed as to the location of the several elements and the best routes of approaching them, guide the elements into new positions when necessary, and act as mediums for transmitting information between the commander and troops of the other arms.

Each battalion and higher headquarters is provided with sufficient agents for linking the commander with the next lower units of his command. For cases which may require a greater number of individuals than are thus provided, the subordinate commanders detail the necessary additional men. For example, commanders of combat trains detail, when necessary, men to act as agents in keeping the appropriate higher commanders informed as to the position of the combat train and for maintaining communication between the higher commander and the combat train. Likewise, when the commander of the field artillery of a division or of a smaller force acting independently, is not with the commander of the troops, the former leaves his adjutant or an appropriate individual to represent him at the headquarters of the command. An important function of the agent so left with the commander of the troops is to obtain, and to keep the field artillery commander advised of, all information which may assist or otherwise affect the field artillery.

785. Agents are especially trained and exercised in carrying verbal messages; in map reading, so that they may be able to pick out positions or roads pointed out to them on the map; in simple sketching, so that they may be able to indicate relative positions of troops, features of the terrain, etc.; in finding their way, both by day and night, to designated distant positions; in signaling; in the use of the telephone.

Certain details in connection with the performance of courier duty by agents are noted below:

786. A courier: (*a*) Makes every effort to keep himself informed as to the location of the subdivision to which he pertains, and as to the route by which it may be most readily reached.

(*b*) When sent on a mission he notes carefully the country traversed, the facilities and difficulties which it offers for the passage of troops, and endeavors to impress upon his mind the features of the terrain so that he would be able to guide troops through it if called upon to do so.

In pursuing a given route for the first time, it is advisable to turn frequently and observe how objects appear after they have been passed; retracing the same route is thus much facilitated.

(*c*) He moves promptly when on an errand, and allows nothing to delay or interrupt him. All military persons are required to expedite the movements of such messengers, and point out promptly the best routes for reaching the subdivision or individual sought.

(*d*) On reaching his destination, if the individual sought is not immediately seen or recognized, the courier calls out the name or military designation of the person sought: e. g., "Commanding officer, Battery A, First Field Artillery."

(*e*) Having delivered the message he waits in the presence of the individual receiving it until notified whether or not an answer is to be taken. In case of delay he asks for instructions.

Important messages should always be in writing, and should be acknowledged by the receiver's initials on the envelope with date and time of receipt.

Verbal messages should always be repeated by the courier in the presence of the sender before starting on the errand. The message should be couched in concise terms. The sender should make sure that the courier grasps its spirit and meaning.

If a courier is aware of the nature of the message carried, and has noted any circumstances bearing upon its subject matter since leaving the sender, he should, after delivering the message, report the circumstances.

(*f*) If a courier, after diligent search, is unable to find the individual to whom he is sent, he should return promptly and report the fact to the sender.

It is the duty of all subordinate artillery commanders, however, to notify the next higher commander, when circumstances require them to make, without the knowledge of the latter, a material change of position.

(*g*) A courier should note matters of military interest, especially those affecting the subdivision to which he pertains, and should make report of any essential matters on his return to the officer to whom he is assigned.

If he carries an order directing a change of position of a subdivision, it is often advisable to direct him to accompany the subdivision into the new position so as to enable him to become familiar with the ground and to be able to report upon conditions in the new position.

SECTION II.—*Route markers.*

787. It is incumbent upon an officer preceding his command for reconnaissance or other purposes to mark the route so that uncertainty may not arise on the part of those in rear as to the route to be followed.

The individuals employed on this duty are termed route markers. All enlisted men belonging to headquarters detachments are trained in the performance of this duty.

The adjutant, or, in his absence, the sergeant major, of a battalion or regiment is charged with the details of the service, thus leaving the commander to devote himself to the reconnaissance or other work.

Within a column it is the duty of each element to maintain touch with the element next preceding it.

788. A marker is made to understand clearly:

(*a*) The route to be followed.
(*b*) The particular organization to be guided.
(*c*) The message, if any, to be delivered.
(*d*) The route he is to follow in order to rejoin the commanding officer.

The marker indicates the correct route, acting as guide if necessary over terrain where the route is difficult to follow, and as soon as his mission is fulfilled hastens to rejoin his commanding officer. If necessary, mounted men may be temporarily taken from the organizations of the command to increase the number of markers. The number employed, however, should always be the minimum consistent with insuring the uninterrupted march of the command.

By the establishment of well-understood conventions, or by the use of suitable signs, the number of markers may be reduced. Thus, it should be understood that a main highway is not, without indication, to be left for a minor road, and that a straight road is not, without indication, to be left for one which deviates from it. By marking arrows on trees and buildings, or by other suitable signs, uncertainties of a minor nature may be removed. In important cases, however, a marker should always be left at places where a reasonable doubt may arise.

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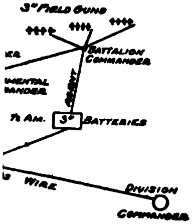
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CHAPTER IV.—TELEPHONE AND SIGNAL COMMUNICATION.

789. Each battery, each battalion headquarters, and each regimental headquarters is provided with suitable signal and telephone apparatus.

Each battery should be prepared to furnish three telephone operators, each battalion headquarters two operators, and each regimental headquarters two operators. The telephone operators must be prepared to act as signalers as well as telephone men.

The available matériel must be employed according to a flexible scheme, and each case must be solved according to the particular necessities.

Frequently, the higher commanders will find it convenient to post themselves near one or more of their subordinates and communicate with them by word of mouth or by couriers. The matériel and personnel thus freed for other use may be utilized in establishing communication with auxiliary observing stations, ammunition trains, or with reconnaissance officers and scouts accompanying the other arms.

Battery Communication.

790. The battery signalers comprise a corporal, designated as "signal corporal," and two privates designated, respectively, as "No. 1 signaler" and "No. 2 signaler."

The signalers are usually assigned to the fifth section of the battery.

The signal corporal is charged with the establishment and maintenance of battery communication whether by visual signals or by telephone. He is also charged with the care of the apparatus.

When the battery commander is separated so far from his battery that communication by visual signals or telephone is necessary, the corporal and No. 1 attend to the maintenance of such communication. They may likewise be employed to maintain communication between the battery commander and an auxiliary observing station.

When signal or telephone communication between the battery commander and the battalion commander is necessary, No. 2 ordinarily acts as operator at the battery commander's station.

Battalion Communication.

791. The sergeant major is charged with the establishment and maintenance of signal or telephone communication for the battalion and with the care of the matériel. During the reconnaissance of the position to be occupied, he receives the battal-commander's instructions as to the means of communication required. He then takes the necessary steps for providing the same. If telephone communication with the battery commander is to be established, the sergeant major examines the ground, selects the best route for the line of wire to follow, and causes the reel cart to lay the wire. If it is convenient to lay the wire so that, after completing the task, the reel will be near the battalion commander's station, this is done; the personnel pertaining to the reel cart are then most conveniently situated with respect to battalion headquarters.

Regimental Communication.

792. Signal or telephone communication between the regimental commander and his battalion commanders, and between the regimental commander and the next higher commander, is established in a manner similar to that outlined in the preceding paragraph for a battalion, corresponding individuals performing similar duties.

Brigade Communication.

793. No special apparatus or operators for signal or telephone communication are provided at brigade headquarters. The means provided for regiments, battalions, and batteries are however, ample to permit connecting all the parts of the field artillery brigade. The brigade commander gives such general instructions as may be necessary to insure the maximum utilization of the available personnel and matériel.

When the field artillery brigade commander directs a regiment or battalion to furnish a certain line, as, for example, to connect the regiments with brigade headquarters, the designated unit furnishes such operators as may be required at brigade headquarters, as well as at other stations on the line to be established.

Laying the Wire for Telephone Communication.

794. The reel cart is operated under the immediate direction of the sergeant major. Having received instructions from the commanding officer, the sergeant major designates a man to ride upon the reel and attend to paying out the wire, details at least one line guard, and indicates the station at which the unreeling is to begin and the order in which the different stations are to be connected up.

When, after completing the laying of the wire, the reel cart is to be near battalion headquarters, it is ordinarily desirable to designate the operator at battalion headquarters as the man to attend to paying out the wire; in any case, the man so designated turns his horse over to the lead driver of the reel cart before taking his place for paying out the wire.

The sergeant major ordinarily accompanies the reel so as to make sure that it follows the most appropriate route, to see that at the different stations the operators are ready and make proper connection to the line, and to give the line guard such special instructions as may be necessary to insure the proper placing and protection of the line.

Whenever practicable, the reel should be unlimbered near the battalion commander's station before beginning to unreel, so that the battalion commander's instruments may be available at once.

The battery signal corporal attends to stretching the wire and setting up the stations in cases involving the use of the battery hand reels.

It is essential that all wire be so laid as to be as far as possible out of the way of probable movements, either of field artillery, of other troops, or of individuals. The wire is stretched either before or after the posting of the guns, as may be most suitable in the particular case. Whenever practicable, it is best to run the wire in front of the line of guns rather than in rear. When the line must be laid on ground which has to be crossed by teams in taking up the position, it is best to wait until the guns have been posted and until the teams have cleared the position before beginning to lay the wire.

Every precaution must be taken to avoid betraying the position when laying the wire. To accomplish this, it may frequently be desirable to cause the reel cart to follow a route considerably in rear of the line which the wire is to occupy and to carry the wire by hand to its proper position after the unreeling has been completed.

Guarding the Line.

795. It is the duty of all men, knowing the position of a wire and seeing it approached by others who are evidently unaware of the location of the line, to give warning by calling, "Wire."

The line guard pertaining to a reel cart follows the reel when the wire is being laid, shifts the wire to the side of the road and takes such other precautions as may be practicable for protecting the wire and minimizing its interference with traffic. After the wire is laid the line guard patrols the line, warning individuals who approach it of its location and making repairs when necessary.

Ordinarily one man is sufficient to guard the line laid by a single reel. If, however, additional men are necessary, they are detailed from the headquarters detachments or, if no members of such detachments are available at the time, they are temporarily detailed from the batteries.

As a rule sufficient warning as to the location of a line pertaining to a battery can be given without its being necessary to detail a special line guard. When necessary, however, the first sergeant details one or more men to patrol and guard the line.

796. ***To use the telephone.***—In speaking into the transmitter the head should be held in a natural position, the lips about an inch from the transmitter.

Use a moderate tone of voice and speak slowly and distinctly, being careful not to slur the words or syllables, but to enunciate clearly each sound.

Never shout or raise the pitch of the voice. Sound each digit of a number singly; thus, 2590 is sent ***two, five, nine, zero.***

Never use the letter O for zero; when so used it is often mistaken for four.

An exact hundred is sent as a hundred; thus, 1800 is sent, ***one, eight,*** hundred.

The same rule applies in sending an exact thousand; 3,000 is sent ***three thousand.***

If it is necessary to repeat, use more care as to distinctness, but do not raise the voice. A single number not understood may be accentuated by counting up to it and emphasizing it. Thus, if the figure four is not understood, say ***FOUR;*** one, two, three, ***FOUR.***

In receiving, observe the following rules:

1. Keep the mind on the message; a person can not receive correctly when he is thinking of something else.

2. Keep the receiver close to the ear.

3. Do not interrupt the sender unless absolutely necessary.

4. Caution the sender when he is speaking too loudly, not loudly enough, or too rapidly.

PART VI.

ARTILLERY IN THE FIELD.

CHAPTER I.—EMPLOYMENT OF FIELD ARTILLERY.

SECTION 1.—*Characteristics of the Arm.*

797. The characteristic properties of field artillery are:

1. Great power concentrated in a relatively small tactical unit.
2. Rapidity of fire.
3. Long range.
4. Ability to act from concealed positions.

The first characteristic facilitates intelligent direction. It enables a commander to hold a powerful force well in hand and to bring it to bear with the desired intensity at the proper place and time.

The second characteristic enables artillery to bring a crushing fire to bear upon a vulnerable enemy before he can escape from its action.

The third characteristic permits artillery great freedom of action, enabling it to interpose effectively over a broad terrain and to secure the concentration of effort of widely dispersed units.

The fourth characteristic facilitates establishing the guns in favorable positions, acting by surprise, preserving freedom of maneuver, and makes it possible for inferior artillery to remain on the battle field.

Field artillery, on the other hand, has certain limitations which prevent its employment as an independent, self-sustaining arm. Among these may be mentioned:

(*a*) It is unable to act otherwise than by fire.

(*b*) It is extremely vulnerable when exposed in the open to percussion fire at medium ranges; also if exposed to shrapnel fire when in route formation or when in the act of occupying a position.

(*c*) When surprised in route formation it protects itself with difficulty by fire action, concealment, or escape.

(*d*) It defends itself with difficulty against attacks on its flanks or rear.

The tactics of field artillery are based upon its characteristic properties and limitations and upon its employment as an auxiliary to the other arms in battle.

SECTION II.—*Principles.*

798. The exact method of employing field artillery depends, as for the other arms, upon the particular tactical situation and upon the plan decided upon by the commander of the troops. The commander of the troops, the artillery commander, and regimental and battalion commanders must clearly indicate to their respective subordinates the objects to be accomplished. Technical details should, as far as possible, be left to subordinates, so that superior commanders may be free to follow the developments of the action and to apply the means at their disposal most advantageously in meeting the varying conditions. The ends to be attained and the methods of attaining those ends vary with the nature of the action, as well as with each particular phase thereof.

The principles set forth in these regulations are the general guides of action. By study and reflection these principles are assimilated; by practice in applying them to real or assumed conditions the habit of prompt and correct action is acquired. To the professional readiness thus obtained must be added loyalty in carrying out the plans of a superior, skill in recognizing and seizing opportunities, and determination to win at any cost.

799. ***Cooperation.***—Artillery has no independent rôle on the battle field. Its sole object is to assist the other arms.

The isolated and independent action of artillery leads to no decisive results; unmenaced by a close attack, the enemy shelters himself from fire.

To secure decisive results, troops must advance and occupy the hostile position. Artillery assists the forward movement by keeping down the fire of hostile artillery, and by neutralizing the hostile infantry—inflicting losses upon it, destroying its morale, driving it to cover, and preventing it from using its weapons effectively.

Close cooperation between the artillery and the troops which it supports is, then, necessary for effective action. To insure this there must be a mutual understanding of each other's methods of action, abilities, and limitations, and sure and rapid means of communication between the various elements concerned. Advancing infantry must be accompanied by artillery officers or scouts, who will communicate to the artillery commander the progress and needs of the advancing infantry.

800. ***Unity of direction.***—Whenever artillery is used, a decisive effect is usually intended. Its influence is powerful in proportion to the timeliness with which it is brought to bear. The characteristic properties of artillery permit its fire to be readily shifted from place to place and to be concentrated or distributed as circumstances require. Effect is ordinarily secured by concentration upon targets which are at the moment the important ones. To insure the utilization of the properties of artillery and their adaptation to the requirements of an action, unity of direction is essential. If the artillery is to be effectively employed in aiding the other arms, it is absolutely necessary that the artillery commander be informed and be kept informed of the plans and intentions of the superior commander and of the tactical situation. In order that this information may be available at the proper time, it is essential that the artillery commander accompany the commander of the troops during the march into action and the preliminary reconnaissance.

A division is the smallest body of troops having artillery permanently assigned to it. The division commander controls his artillery through his senior artillery commander, giving him general instructions as to positions to be occupied and tasks to be performed, and holding him responsible for results secured.

An officer charged with the accomplishment of a special mission, or one commanding an important sector of a battlefield, should, in general, have command of the artillery designated to cooperate in the tasks assigned him. When it is necessary to detach bodies of artillery from their regular organizations for this purpose, it should be done by order of the superior commander only, who will make it clear to all concerned with whom the command of the detached artillery lies. When once detached, they are not returned to their proper organizations without similar authority. In emergencies, however, artillery finding itself in a given sector without definite instructions should at once report itself to the commander of that sector.

Unity of direction is favored by keeping the batteries, especially within the battalion, fairly close together. A well-organized communication service is essential to coordinate direction. It is the rule to use field artillery in regiments or battalions. The employment of batteries singly is the exception, while the employment of smaller subdivisions is warranted only under the most exceptional circumstances.

While unity of direction, as a general principle, governs in the employment of field artillery, this does not remove or restrict the obligation imposed upon all officers to meet the sudden and unexpected emergencies of an action, when time does not admit of reference to the next higher authority.

801. *Utilization of force.*—The number of batteries actually brought into action must be sufficient to dominate the situation from the outset and to assure the prompt and effective accomplishment of the specific task assigned to the artillery. To secure decisive results, superiority of fire is, in general, necessary; but it is important, especially at the earlier stages of an engagement, that the number or the positions of the guns should not be prematurely betrayed nor ammunition be uselessly expended by the employment of a greater number of guns than the actual situation requires. Moreover, it is essential that the superior commander should always have at his disposal batteries that can be utilized to meet the recurring emergencies of battle.

It is, therefore, a principle that all guns should be placed in position at an early stage of the action, but only so many of them should be employed at any one time as are actually necessary. It is not, as a rule, desirable to detail field artillery to form part of a general reserve. The true reserve of field artillery is its ammunition train.

802. *Preparatory dispositions.*—Premature commitment of artillery to action is to be avoided. On the other hand, artillery must be available and ready for every duty as it arises.

Readiness for action is secured and freedom of maneuver retained by posting artillery in or near suitable concealed positions, and making all preparations for meeting the probable phases of the action.

To facilitate the work of preparation, the duties assigned to artillery in observation or in readiness are made as definite as the conditions will permit. Thus, the terrain in which the enemy is expected to appear may be divided up into sectors and each sector may be assigned to a given group. Moreover, both in the preparatory and the later phases of an action special duties may be assigned to particular batteries.

For example:

1. To fire upon the hostile artillery. Such batteries are called *counter batteries*. This designation may be made previously to opening the engagement, in order that the hostile artillery may be discovered and fired on before it can seriously enter the engagement, or it may be made after a portion of the hostile artillery has become effective and it is necessary to overpower it and keep it under subjection. The term, then, is distinctive of those batteries whose special function it is to combat the enemy's artillery.

2. To prepare and support the infantry attack. These batteries are called *infantry batteries* and include those assigned to the direct support of our infantry, assisting it by firing on the hostile infantry, by opening breaches in the enemy's lines, or by otherwise facilitating the advance. The infantry batteries are under the protection of the counter batteries, and include the so-called *batteries of preparation*, which fire on the opposing infantry, and the *breaching batteries*, whose mission is to open by their fire passages in the enemy's lines through which our troops may advance.

3. To be prepared to meet a counter attack. Such batteries are called *batteries of the counter attack*. Batteries of the counter attack are posted in observation, carefully watch the terrain, and assist in defeating any counter attack the enemy may make.

4. To advance to the close support of the infantry attack. These batteries are called *accompanying batteries*. The term accompanying batteries must not be too narrowly interpreted as meaning an actual presence of the accompanying batteries on the infantry firing line, for in reality these batteries accompany with fire rather than by actual movements of the guns. Batteries may, however, be actually moved forward when by such forward movement a distinct and positive advantage will be obtained or the morale of the infantry be materially increased.

5. To come to the assistance of other batteries. Batteries designated for this duty are called *reenforcing batteries;* such batteries may have been previously held in observation or readiness, may have just arrived on the field or been called in from an adjacent sector.

6. To draw the fire of the enemy's artillery which has not yet disclosed itself. Such a battery is called a *decoy battery*.

It is usually placed in an advanced position with wide intervals, and acts with great rapidity of fire so as to lead the enemy to believe he is opposed by a much larger force, thus inducing him to disclose his position.

The above examples must not be construed as authorizing a rigid, unchanging division of duties. Individual batteries may be called upon to perform, during the course of an engagement, all of the functions indicated.

The superior field artillery commanders must follow closely the developments of the action and make such modifications in the duties to be performed and the sectors to be covered as will make it possible to quickly concentrate the maximum obtainable fire upon the targets which at any particular time are most dangerous to our infantry.

803. ***Employment of fire.***—The power of artillery should not be frittered away in desultory bombardments nor upon unimportant targets. Its employment is to be adapted to the phases of an action, so that it may exert the strongest influence upon the important objectives and at the critical moments.

The opportunities of striking an enemy while he is vulnerable are ordinarily intermittent and brief. They occur, for example, when the enemy moves from cover to cover, or when he exposes himself in order to contend effectively against our own troops.

Suddenness of action is thus often a necessity. If the action is also by surprise, effect, especially the moral effect, is increased.

The outbursts of rapid fire called for will therefore be intermittent, depending upon the nature and phase of the combat.

A prolonged deliberate fire, however, may be requisite for destroying material objects; for holding a sheltered enemy under subjection, preventing his supply and reenforcement, and precluding his effective interposition in the engagement; for searching for an enemy's reserves, etc.

Opportunities for using flanking and oblique fire must be sought.

These methods of action are made possible and effective by timely reconnaissance, by skillful selection and occupation of positions, by careful preparation and an efficient conduct of fire, and by thorough cooperation between the artillery and the troops it is ordered to support.

804. ***Economy of ammunition. It is made the duty of every field artillery commander to exercise constant and unremitting care to economize ammunition.***

Fire will be stopped at the instant the desired effect is produced; methods of fire that involve great expenditure of ammunition will not be permitted except when vitally necessary; small and unimportant targets will not be fired at; and all officers, by careful supervision and observation, will aid in reducing the amount expended to the minimum necessary to produce the required results.

CHAPTER II.—CONTROL OF FIRE.

805. The commander of the troops determines the object of the action and generally the target for the artillery.

The distribution of objectives and the determination of the way in which the artillery is to attack them is the province of the artillery commander.

806. At the beginning of the action the artillery brigade commander, knowing the objectives of the infantry, what troops are designated to attack these objectives, and the degree of importance of these different attacks, distributes the batteries at his disposal so as to best accomplish the desired results. He designates the battalions that are to support a particular attack and those that are to be held in observation or readiness to meet the developments of the action. As the combat progresses he keeps himself informed of the progress of the different attacks and modifies, if necessary, the initial distribution of the batteries. He keeps his subordinates informed, as far as possible, of changes in the general plan and makes clear to them the mission given to each to accomplish.

In certain cases it may be necessary for the artillery brigade commander to exercise direct control over units smaller than a regiment. Such control is exceptional and should be limited to cases in which the smaller unit is widely separated, both in place and duty, from its regiment.

807. The regimental commander habitually directs the fire of his unit in compliance with the orders he has received, and during the course of the action indicates the portions of the enemy's lines upon which the fire of his unit may have to be concentrated.

His further duties as a commander are to watch the enemy's troops and the dispositions and movements of the troops with whom his regiment is cooperating. In cases where a brigade is much extended he need not always await orders; should the tactical situation become altered, he is empowered and it is his duty to alter the direction of the fire; he should, however, at once send and inform the brigade commander. He may, in exceptional cases, conduct the fire of his unit.

808. The battalion commander directs the fire by assigning targets to the batteries and by furnishing them such data as will tend to increase the efficacy of their fire. To this end he transmits to them such information concerning the nature of their targets, ranges, conformation of the ground in the vicinity of the objectives, etc., as may become available from maps, reports, and orders received, and from his personal reconnaissances.

The simultaneous adjustment of fire by several batteries on the same target should not be attempted unless it is possible to clearly distinguish the shots of the different batteries firing. If this condition is not fulfilled, the adjustment should be made by one battery only and verified by the others.

The battalion commander must keep himself constantly informed as to the effect of the fire.

Auxiliary observers and scouts, who should, if possible, be accompanied by mounted orderlies, may be used to report upon the general fall of rounds with reference to the target and upon changes in the latter. An effect clearly seen gives the most reliable information.

In exceptional cases the battalion commander may have to conduct the fire of his unit.

809. Sudden changes in the tactical situation may cause the battalion commander, on his own responsibility, to direct the fire of his batteries on targets not originally assigned to his unit. In this case he will at once report the fact to his immediate superior.

Within the battalion every change of objective is ordered by its commander and communicated to all batteries concerned. As in such cases fresh adjustment, as a rule, becomes necessary, involving loss of time, the targets should not be changed except in emergencies until the results sought for against the former target have been fully attained.

It is the duty of all commanders to transmit to officers conducting fire all available information which would assist in adjusting the fire or in increasing its effect. It is the duty of newly arriving units to seek information of this character from units already in action, and it is the duty of all officers having this information to furnish it.

When necessary for the close defense of his battery, the battery commander may order change of objective at his own discretion.

810. Conduct of fire is ordinarily the province of battery commanders. Battalion commanders indicate targets and assure themselves that such targets are properly verified. Technical details are left to battery commanders unless the battalion commander is convinced from reliable observation that the target is misunderstood or that, for any other reason, the fire is ineffective.

CHAPTER III.—RECONNAISSANCE AND SELECTION OF POSITIONS.

SECTION I.—*Choice of position.*

811. The area within which the field artillery must take position is determined by the tactical situation and the plan of action decided upon by the commander of the troops. The field artillery is not free, therefore, to choose its own position, but must make the best use of the terrain within the limits thus imposed.

812. The commander of the troops, after receiving the recommendations of the field artillery commander, designates the places near which the field artillery is to find its positions and influences the distribution of batteries by indicating the duties which are to be performed. The artillery commander distributes the areas to be occupied among the several regiments or, if necessary, smaller units, and indicates the nature of the positions to be occupied by assigning duties to the several units.

In many cases it may be practicable to embody the assignments, etc., made by the artillery commander in the order given by the commander of the troops. Regimental commanders assign positions and duties to their battalions with as much exactness as the situation admits. Battalion commanders assign, within narrow limits, positions to their batteries, and influence the emplacement of the guns by giving instructions as to the degree of defilade to be sought.

Since the proposed plan of action influences the choice of positions, it is important that all of the above commanders transmit to their subordinates all available information as to the plan of action and the part to be taken by their respective units.

813. *The only invariable rule in the choice of a position is to so post the guns as to be able to carry out effectively the task assigned them.*

Important considerations in the choice of a position are:

1. Obtaining a range not much greater than 3,000 yards.
2. Securing a large field of fire.
3. Concealment from view.
4. Facility of movement to the front, flanks, and rear.
5. Proximity of good cover for teams.
6. Favorable conditions for resupply of ammunition.

Positions combining all of the above qualifications are seldom or never found. The choice as to which consideration most weight is to be attached depends upon the tactical situation.

814. By a suitable choice of positions and of observing stations a great part of the terrain within range of the guns may be included within the field of fire. The nature of the case will decide whether direct or indirect laying, or a combination of the two, is to be employed.

815. The existence of dead spaces may be obviated and the field of fire enlarged by the skillful disposition of the units of a field artillery command. Longer ranges than 3,000 yards may be used advantageously when, by so doing, dead spaces may be avoided, the field of fire enlarged, or a flank or oblique fire obtained.

By an intelligent dispersion of units the effect of the enemy's fire is diminished, and his difficulties in adjustment increased. Good organization of the services of information and communication may secure concentration of effort even though the units be widely separated. Such separation, however, increases the difficulties of command.

816. When not incompatible with the effective accomplishment of the duty to be performed, concealment from view is always to be sought. This is true whether direct or indirect laying is employed. By rendering the guns inconspicuous, or entirely concealing them, their sustained service may be counted upon, while the difficulties of the enemy in locating his targets and adjusting his fire are increased.

817. Skill in the concealment of guns is to be acquired by careful study of ground and by extensive experience on a varied terrain. The following suggestions are to be noted:

Positions which, from the enemy's point of view, are on the sky line are usually the most conspicuous. By placing the guns below the sky line, so that they will have a favorable background, and by preventing movements of the personnel, a battery may be unrecognized even though it is in the open. It is important, however, to have a crest, a hedge, or a clump of trees in front, so as to increase the enemy's difficulties of observation and of exact location. In the absence of natural cover, artificial means may be used to conceal the guns.

A position in rear of a crest, with a parallel crest, of about the same height in front and some distance away, offers many advantages. The enemy is apt to mistake the crest nearest him for the one actually occupied and to consider shots falling between the crests as beyond his target. Trees, a hedge, standing grain, etc., 400 or 500 yards in front of the guns, and so that the line of sight just passes over them, may similarly serve to deceive the enemy as to our actual position.

When indirect laying is to be employed, a position just far enough behind a gently sloping crest to insure the concealment of the flash best facilitates running the guns up to the crest, should direct laying be called for. If the position is discovered by the enemy, however, and the crest is plainly seen by him, the guns are in a very vulnerable position, as shrapnel may be employed to search such a reverse slope very effectively.

The most advantageous position, from the point of view of concealment alone, is one at least 400 yards in rear of a covering mass, and hidden from the view of any auxiliary observers of the enemy pushed to the front or flanks.

Covering the ground in front of the muzzles with branches of trees, cornstalks, etc., prevents the raising of dust by the blast of discharge.

818. *Firing over friendly troops.*—Firing over the heads of our own troops is to be regarded as a normal procedure.

Freedom is thus gained to post artillery so as to cover effectively the whole front of the combat, and to realize the power of concentrating the fire of widely separated lines.

819. ***Ruses.***—Dummy emplacements suitably prepared will often serve to deceive the enemy, distract his attention, and cause him to waste ammunition.

A few guns may be sent to occupy detached positions with a view of drawing the enemy's fire and leading him to disclose his positions and strength. Such guns should be posted with wide intervals; their rapidity of fire may be utilized to produce the impression of a large force of artillery.

SECTION II.—*Reconnaissance.*

820. The duty of locating the enemy and of securing information concerning him devolves in general upon troops of the other arms. It is most essential that the information thus secured should be promptly transmitted to the artillery. As successful cooperative action depends in great measure upon the maintenance of quick and reliable communication between the different elements of a command, artillery commanders should use every means in their power to establish such relations with commanders of the other arms as will insure prompt transmission of information.

821. The artillery must, however, obtain for itself such special information as is needed to insure the proper posting and the effective employment of the guns to carry out the tasks assigned it. For this purpose reconnaissances are made by the artillery commander and his immediate subordinates, assisted by their respective reconnaissance officers and scouts.

The effective action of artillery is enhanced by (*a*) selecting at once the most favorable positions; (*b*) making the necessary preliminary dispositions, such as securing firing data, organizing a suitable information and communication service; (*c*) preparing cover; (*d*) posting the guns without the knowledge of the enemy; and (*e*) opening at the proper time a sudden, unexpected and overpowering fire upon the designated objectives.

When it is necessary to bring guns into action quickly for the support of other troops, the main consideration is to get them as promptly as possible to a place from which they can render effective support. In such a case, delay occasioned by the search for technical and tactical advantages is entirely inadmissible. A good eye for ground and skill in making use of available cover may, however, even here permit an artillery commander to post his guns advantageously.

As a rule, though, the necessity for the employment of artillery may be foreseen, and opportunity may be gained for timely preparation.

822. It is essential that the officer commanding the artillery should be in close touch with the officer commanding the troops; he should accompany him on the preliminary reconnaissance; should be kept constantly informed as to the tactical situation and the plan of action, and should receive early instructions as to the special tasks to be performed by the artillery. Similarly, subordinate artillery commanders should be kept informed of the general plan of action and of the situation, so far as it affects them.

At the earliest opportunity the officer commanding the artillery reconnoiters the ground which is to be the scene of action and selects the positions for the artillery in accordance with the instructions which he has received and the tactical requirements of the situation. He causes his immediate subordinate commanders to accompany him, or informs them when and where they are to report to receive their instructions and undertake their own reconnaissance. It is important that they should reach the ground at the earliest practicable moment.

823. In undertaking a reconnaissance an artillery commander should have a clear idea in his mind of the general plan of action and of the task to be accomplished by the force under his command. Unembarrassed by details, he should study the tactical situation and the lay of the ground, select the position with a view to carrying out his special mission, and arrange for the necessary preparatory dispositions. The details of securing information, etc., should be performed by reconnaissance officers and scouts.

824. It is advisable to attach artillery reconnaissance officers to advanced troops in order that they may secure early information as to the enemy, and give the artillery commanders detailed information as to the ground available for occupation by the artillery and as to the location and disposition of the enemy and of friendly troops. To insure effective cooperation such officers generally accompany the commanders of the attacking infantry lines during an action, in order to keep the artillery commander informed as to changes in the tactical situation and as to the cooperation desired of the artillery by the infantry.

Reconnaissance officers of the smaller artillery units may be attached to the senior artillery commander, when action is imminent, in order that they may commence, before the arrival of their own immediate commander, the detailed reconnaissance of the position selected for the particular unit concerned. A reconnaissance officer operating in this manner, as well as one who arrives with his immediate commander, examines the neighborhood of the position, locates the enemy, prepares firing data, and, in general, secures the necessary information for his commanding officer and relieves the latter of details.

825. Scouts may be employed to assist reconnaissance officers and supplement the information secured by them.

826. Reconnaissance duties pertaining to various individuals in a force comprising several battalions of artillery are indicated below; the summary thus given, however, is to be regarded merely as a general guide, and not as specifying all the duties to be performed.

Artillery commander—

(*a*) Informs himself as to the enemy's location and dispositions.

(*b*) Examines the terrain and recommends places for posting the field artillery.

(*c*) Assigns the regiments, and, if necessary, smaller units, to duties and to areas to be occupied in accordance with the plan decided upon by the commander of the troops.

(*d*) Takes general measures to insure communication between the field artillery and the other arms, as well as between the elements of the field artillery itself.

(*e*) Takes general measures to insure the support of the field artillery and its resupply.

Regimental commander—

(*a*) Informs himself as to the enemy's location and dispositions and as to the location and dispositions of friendly troops.

(*b*) Examines the area assigned his regiment by means of a reconnaissance which should be as thorough as the situation permits.

(*c*) Assigns the battalions to positions and duties with as much exactness as the conditions permit.

(*d*) Takes measures to insure communication between his headquarters and the troops which his regiment is to support, as well as between his headquarters and the stations of his battalion commanders.

(*e*) Supplements the arrangements for supporting his regiment and for the supply of ammunition in accordance with the instructions which he has received.

Battalion commander—

(*a*) Secures by personal observation and by the employment of his reconnaissance officer and scouts information as detailed as possible as to: The location and disposition of the enemy; the location and disposition of friendly troops; the terrain in the neighborhood of the position—the best methods of approaching it advantageously, its freedom from the enemy, etc.

(*b*) Examines the general position assigned him and selects the most suitable positions for the batteries.

(*c*) Assigns the batteries to duties and to positions.

(*d*) Determines whether or not artificial cover is necessary, giving instructions therefor in case of need.

(*e*) Provides for such auxiliary observing stations as may be needed to secure information as to the effectiveness of our own fire and as to the movements of the enemy and of friendly troops.

(*f*) Provides for communication with battery commanders and with observing stations.

(*g*) Makes sure that the security of the position is provided for by adjacent troops or by scouts.

(*h*) Selects practicable routes for subsequent possible movements to the front, flanks, or rear.

(*i*) Provides for the resupply of ammunition, selecting a position for the combat train in case the battery combat trains are united.

Battery commander—

(*a*) Examines the target assigned him and studies carefully the ground in its neighborhood.

(*b*) Examines the ground assigned him for a position and picks out the most suitable place within the limits imposed for posting the guns.

If direct laying is to be employed, he makes sure that each gunner will be able to see through the sights the part of the target to be assigned to him.

If indirect laying is to be employed, he makes sure that each gun will be able to fire over any intervening obstacle, and selects an aiming point, verifying the fact that each gunner will be able to see it through the sight.

(*c*) Selects a suitable observing station.

(*d*) Arranges for such battery communications as may be necessary.

(*e*) Determines the best method of approaching the position, under cover, if possible.

(*f*) Selects the place for posting his limbers.

(*g*) Selects position for his combat train (whenever the battery combat trains are posted separately), doing so with an eye to facilitating the supply of ammunition under cover.

(*h*) Secures such firing data as may be needed.

(*i*) Joins his battery and posts it in the position.

The reconnaissance officer—

A reconnaissance officer is, in general, charged with:

(*a*) Securing by personal reconnaissance (assisted by scouts) such information as to the enemy, our own troops, or the terrain as the officer to whom he is attached may desire.

(*b*) Supervising the work of scouts, observing parties, etc.

(*c*) Securing such firing data, preparing such sketches, and tabulating such data as may be requisite to assist in the direction and conduct of fire.

(*d*) Overlooking the field of action, watching for movements of the enemy and of our own troops which may affect the situation, and keeping his commanding officer apprised of changes in the situation.

827. An artillery reconnaissance officer attached to advanced troops should, as soon as possible after the determination of the enemy's location, submit to the artillery commander a report giving such information as is obtaininble as to the enemy and describing the most suitable position for our own artillery. This report should be accompanied by a position sketch in plan, showing the enemy's position, the position selected for our own artillery, the characteristics of the country intervening between the two, the routes by which the selected position may be best approached, and such other important information as may be readily set forth. The report should embrace information such as the following relative to the position selected: (*a*) Ease or difficulties of the route of approach, stating difficulties, if any; (*b*) possibility of approach under cover; (*c*) whether direct or indirect laying is recommended; (*d*) cover afforded for guns; (*e*) need of providing artificial cover; (*f*) number of guns which may be posted advantageously in the position; (*g*) facilities for protecting the limbers, horses, etc.; (*h*) facility for resupply of ammunition; (*i*) in case indirect laying is recommended, possibility of securing good aiming points and good observing stations and of firing over intervening obstacles.

As to the enemy, the report should include information as to: (*a*) his apparent numerical strength; (*b*) what is known as to the position of his artillery. In the absence of definite information, the probable position of his batteries should be indicated.

828. Whether in a position thus tentatively selected or in one chosen by an artillery commander, a reconnaissance officer is required in appropriate cases to prepare a panoramic sketch of the enemy's position. The known positions of the enemy, and prominent features of the landscape as well, are named or numbered on the sketch; copies of such a sketch being sent to the subordinate artillery commanders, the indication of objectives may be facilitated. Firing data are also secured by the reconnaissance officer and those pertaining to each important position shown in the sketch are indicated above it in the margin. When individuals using such a sketch for identification of positions are widely separated, allowance must be made for difference in point of view; moreover, in such cases the firing data should either be omitted from the sketch or should be transformed for use in each position concerned. The position from which the sketch was made should always be plainly described on the sketch.

CHAPTER IV.—ADVANCE TO AND OCCUPATION OF THE POSITION.

SECTION I.—*Subdivision for action.*

829. Before occupying a position for action, the batteries of a field artillery command are habitually subdivided as explained in paragraph 727.

The place and time for subdivision are determined by the circumstances of the case. From a purely field artillery point of view it is desirable that the subdivision should not take place too soon, as the interposition of other troops might then render it difficult for the combat trains to remain in effective touch with their firing batteries. On the other hand, when action is imminent, the commander of the troops will frequently wish to march the combat trains of the field artillery at the rear of the column, so as to avoid delaying the entry into action of a portion of the infantry.

The field trains of the several batteries are habitually united into regimental field trains and marched at the rear of the combatant troops with the field trains of the other arms.

830. When the combat trains are left in the column, they are marched with their batteries or are assembled and marched in rear of their battalions, as the battalion commander may direct. In this case the combat trains are required to fall out of the column when a suitable place near the position to be occupied is reached.

831. When the combat trains are directed to march at the rear of the column, they are habitually assembled by battalions or by regiments. The assembled combat train is commanded by the senior officer present therewith.

In this case careful arrangements must be made to assure the maintenance of communication between the firing batteries and the combat train. Each group of combat trains sends an officer, with the necessary mounted men, to accompany the commander of the unit to which the group belongs. The officer thus sent forward acts as an agent of communication between the group of combat trains and the unit to which the group belongs. When the firing batteries of the unit go into position, this officer receives the instructions of the battalion or regimental commander as to the position to be occupied by the combat train, reconnoiters the approaches thereto, and reports to the commander of the group of combat trains.

832. The commander of the combat train, or of a group thereof, posts his train so as to secure the freest and quickest communication with the firing batteries consistent with protection from hostile fire; orders such movements of the combat train as the developments of the action may from time to time require; and uses every means in his power to insure the uninterrupted supply of ammunition from the combat train to the batteries on the one hand, from the ammunition train to the combat train on the other.

833. Each firing battery is, as a rule, furnished with ammunition directly from its own combat train. The commander of a group of combat trains may, however, make transfers of ammunition in such manner as the necessities of the service may require.

SECTION II.—*Advance to the position.*

834. All field artillery commanders habitually precede their commands to the position to be occupied. Every effort should be made to conclude all preliminary arrangements for action prior to the arrival of the firing batteries. Delay in opening fire must not be caused by lack of timely reconnaissance and preparation.

835. If ample opportunity for preliminary reconnaissance has been afforded, battery commanders should meet their batteries a short distance in rear of the position and should personally conduct them into the position selected. The familiarity of the battery commanders with the terrain and with the positions to be occupied will enable them to move by the most favorable routes, take every advantage of cover, and prevent delays in the march.

In many cases, however, it will be impracticable for organization commanders to return to their commands, and it will therefore be necessary for the senior officers with the units to conduct the march forward to the position.

836. When the commander rides forward on reconnaissance, and desires his command to follow at once, he instructs the officer left in command as to (1) the tactical situation; (2) the time and place for subdivision, if such subdivision has not been made; (3) the route to be followed; (4) the rate of march. Additional instructions may be transmitted from time to time by markers, who should be left at places where uncertainty as to the route may arise or where difficulties are to be avoided. As soon as the position and the best method of approaching it have been determined upon, agents or scouts may be sent to meet battalions or batteries and guide them by the most favorable routes to their respective positions.

837. If not inconsistent with the requirements of the tactical situation, concealment from the enemy's view is always to be sought during the approach to and occupation of the position. The possibility of action by surprise is thus secured.

Reconnoitering parties, scouts, and other members of the headquarters detachment must operate so as to avoid indicating the position which is to be occupied. If exposure is necessary, it should not occur in the neighborhood of the chosen position.

The necessity must be borne in mind of remaining concealed, not only from ground occupied by the troops to be attacked but also from ground on which hostile observing stations may be located.

To avoid raising dust, movements in the neighborhood of a masked position should habitually be made at a walk. If exposure in the route of approach is unavoidable, such place should be passed at a rapid gait and, if necessary, by the successive movement of carriages.

838. The approach to and occupation of positions under cover of darkness is of frequent occurrence. In such cases the route must be most carefully marked at close intervals and all the details of the movement determined in advance by reconnaissance during the day.

SECTION III.—*Occupation of the position.*

839. When direct laying is to be employed the guns may be unlimbered in the open, each gun in a position for immediate action. Preferably, however, they are unlimbered behind cover and run up until able to fire over the cover.

When indirect laying is to be employed, the guns may be unlimbered behind cover, each gun in the position from which it is to fire.

840. Movements of the guns by hand are often unavoidable, but every effort is to be made to reduce this labor. By proper reconnaissance the exact position which the guns are to occupy may be determined. They should then be drawn by the horses as close to these positions as the circumstances warrant.

A definite decision must be made as to the extent to which a masked occupation of the position is permissible or possible. If the occupation of the position will be at all visible to the enemy, delay in getting the horses away from the battery and in establishing the guns and caissons in position may be fatal. It is preferable in such cases to require the horses to draw the guns boldly to positions from which they can immediately open fire, without any man handling whatever. Careful preliminary training permits this to be done promptly, without confusion and with minimum exposure of personnel and animals.

841. When the circumstances warrant it, however, it is always preferable to unlimber under cover. If direct laying is to be employed, the guns are run up by hand, after unlimbering, until each gunner can just see his target through the sights. By approaching the position from the flank in double section column, the guns may be drawn most nearly to the positions which they are to occupy, while still keeping the horses concealed from view. Causing the drivers and cannoneers to dismount still further promotes close approach and concealment from view. The drivers should not be dismounted, however, if the battery is liable to come under fire. By requiring all individuals to keep under cover and by avoiding all movements on the crest line, a position may readily be occupied without the knowledge of the enemy.

842. If indirect laying is to be employed, the guns may, as a rule, be drawn by the horses to the exact places from which they are to fire. If a position near a crest is desired, defilade is ordinarily secured by posting the guns just in rear of mounted men posted at the emplacement of each gun, so that the highest hostile position is just concealed by the crest from their view. If a position well in rear of a covering mask is to be occupied, ability to fire over the mask, to see the aiming point selected and to secure a proper observing station are matters of principal concern.

843. Before the arrival of the guns, the artillery commander should have determined exactly where they should be posted so that their front will be approximately normal to the proposed line of fire, and so that each gunner will surely be able to see the target or aiming point, as the case may be. Markers may be posted where the right and left guns are to rest; but this should never be done if there is any chance of the attention of the enemy being called to the position about to be occupied.

844. When artificial cover is prepared, emplacements may be made for the guns only. In this case, the ammunition is removed from the caissons and placed near the guns so that it will be available for quick service and protected from hostile fire. The caissons, after being refilled, may be posted with the combat train, or under suitable vertical cover near the guns. In this case hand fuse setters will be used.

SECTION IV.—*Posts and formation of limbers, combat trains, and ammunition train.*

845. The preservation of the ability to move artillery depends upon the protection of the teams from hostile fire.

846. ***The limbers.***—The position to be occupied and the formation to be taken by the limbers depend upon the nature of the cover available. To secure the maximum protection and to have free and prompt access to the guns are the objects in view in selecting the position for the limbers.

Concealment from view and protection from fire as well, are secured by placing the limbers behind vertical cover, natural or artificial. When such cover is available the limbers are ordinarily placed in section or double section column parallel to the cover.

Ridges having slopes of easy gradient afford concealment from view. They do not, however, afford protection from searching fire. The effect of searching fire in such cases may be avoided or greatly reduced in amount by placing the limbers about 500 yards in rear of the firing batteries.

When it is impracticable to conceal the limbers from the view of the enemy, they should be posted as far from the guns as the conditions of the case warrant, and formed in line, faced toward the enemy, with as wide intervals between carriages as the ground will permit.

847. *The combat trains.*—Ordinarily a position for the combat train is selected during the reconnaissance, and an agent is sent to guide the commander of the combat train to his position. If this is not practicable the commander of the combat train halts his train under cover, reconnoiters, and selects a position. Protection from the fire of the enemy and a covered approach to the guns are the objects sought. As a rule it is desirable to have the combat train within 600 yards of the guns; if, however, ample cover is not available, this distance should be somewhat increased.

The commander of the combat train, after having posted his train, makes all necessary provision for further movements of his train, supplying ammunition, and maintaining communication with his immediate commander. In large commands, it is usually necessary to assemble the combat trains by battalions, and it may be necessary to provide for maintaining communication with the several firing batteries, in addition to the communication maintained with the battalion commander.

848. *Artillery ammunition train.*—This train is usually directed by the commander of the troops to proceed to some central point from which roads radiate to the position, and there place itself at the disposal of the artillery commander. The place selected depends upon tactical considerations, the terrain, and communications. Its first position is usually 2 or 3 miles in rear of the firing batteries. The operations of the artillery ammunition train after arrival at this point are controlled by the artillery commander. The train makes all dispositions to secure prompt resupply of the batteries in ammunition, men, matériel, and horses.

849. All parts of an artillery position are connected up by wire and stations furnished from the artillery personnel and matériel.

CHAPTER V.—CHANGES OF POSITION.

850. If the conditions permit, it is most important to post artillery at the outset in positions from which it can act effectively throughout the various phases of the engagement. This consideration should be kept in mind in forming the plan of action and in utilizing the available ground.

If guns are rendering effective service, changes of position in the midst of an engagement should be made only when some very distinct advantage will thereby be gained. Changes involve interruption of fire, necessitate a new adjustment, and, if made in the view of a vigorous enemy, are apt to result in paralyzing losses in men and animals. A reduction of the range is not in itself ordinarily sufficient to warrant such a change, provided the guns are doing effective work and their continuous action is important.

851. Changes of position may, however, be essential as an action develops, whether to secure a more desirable position to the front or flank, or to reach positions for covering a movement to the rear. Artillery commanders must anticipate and prepare for such movements. Scouts, and, if practicable, reconnoissance officers, must be employed to reconnoiter and select routes, to remove obstacles, and perform such pioneer work as may be needed, and to prepare themselves to guide organizations over the routes selected.

852. Officers commanding batteries, battalions, and the higher units of artillery precede their organizations to the new position for purposes of reconnaissance, just as soon as the conditions of the case admit. If the movement is made under fire, however, battery commanders must decide whether it is best for them to ride ahead or to remain with their batteries and send a lieutenant for reconnaissance purposes. When a retreat is in question the artillery commander must likewise decide whether it is more important for him to stay with his rearmost batteries and determine how long they should remain in action, or whether he should occupy himself with selecting new positions for the artillery to cover the line of retreat.

853. Changes of position are always made under cover if practicable, the importance of occupying the new position without the enemy's knowledge and of opening upon him by surprise being always kept in mind.

854. In many cases the change of position can be made only at night. In such cases the movement must ordinarily be made without lights, in the utmost quiet, and every precaution must be taken to avoid losing the route. Scouts must be sent out in the daytime to go over the ground and pick out the best route to the new position. In difficult cases, as for example in movements over country where roads are not available, it is advisable to select landmarks or stations along the selected route and move cautiously from one to the other, a chain of scouts being used to mark the route between stations.

855. If a hasty movement is imperatively demanded, great losses may be avoided by skillfully using the cover afforded by the ground and by moving rapidly over spaces where exposure is inevitable. If the guns are under effective fire of the enemy's infantry or artillery, a change of position should not be attempted, as it is impracticable to bring up the horses for limbering; in such cases, a lull in the action must be utilized for moving the guns to a position in which they can be limbered under cover. If a repulse is imminent and the guns are being threatened by the enemy's advancing troops, then the opportunity for withdrawing must be gained by beating back the enemy and securing at least temporary immunity from his fire. It is useless to bring up the horses under close and effective hostile fire. On the other hand, artillery, as long as it has ammunition, should be able to thoroughly protect its own front. At the last, officers and men should take shelter among the carriages and with their pistols force the enemy to pay the dearest price for the possession of the guns.

856. Changes of position of the larger bodies of artillery are usually made by echelon, a portion of the force being thus always in position to cover the movement of the remainder. A single battery, however, is not ordinarily echeloned for a change of position; but when a movement has to be made across a fire-swept zone, it may be necessary to move by single carriages.

857. The formation to be adopted for a change of position must be extremely flexible, so that the march may be most readily adapted to the lay of the ground and so that changes of formation will be necessitated as little as possible by obstacles which may be met. For individual batteries flank column or double section column is ordinarily to be recommended. The larger units should endeavor to move on as large a front as possible and with wide intervals; if they must move in column, then the distances should be considerably increased.

858. The gaits to be employed in a change of position are determined entirely by the conditions of the case. When a movement has to be begun in the midst of great excitement, however, it is habitually commenced at a walk so as to steady the command and avoid the possibility of confusion.

859. A change of position by certain batteries may be necessitated by the fact that the enemy has succeeded in locating them and in securing the ascendancy of fire. A short movement by hand during a lull in the fire may be sufficient in such cases.

860. It is the province of the commander of the troops to order changes of position of artillery. When emergencies arise, however, which do not admit of reference to higher authority, the artillery commander on the spot must act promptly and decisively, moving the guns if necessary so as to deal to the best advantage with the new situation which has arisen. His action should be at once reported to the next higher authority. It is of the utmost importance, however, that the plans of the higher commander should be well known to his subordinates so that the initiative of his subordinates may be exercised in conformity with those plans.

861. When an important change of position is imminent, battery commanders must endeavor to have the ammunition chests of the firing battery fully replenished in readiness for the movement.

A battery which has expended all its ammunition does not for that reason retire; it secures a fresh supply. While awaiting replenishment it shelters the unemployed personnel.

A disabled gun is not sent to the rear during the action; if it can not be repaired on the firing line it is left there.

As a rule, batteries are not relieved, but are supported by fresh batteries.

Batteries will not retire, even in the face of imminent danger, without orders. The loss of well-served guns in the defense of a position, or in close support of the other arms, is honorable.

CHAPTER VI.—COMBAT.

SECTION I.—*Field artillery with the advance guard.*

862. The action of field artillery with an advance guard will vary with the object the advance guard has in view. It should not occupy positions from which it can not be withdrawn without a general engagement, perhaps not intended by the commander of the force. Its main duties are to break down any resistance to the advance of the other arms, or to cover their retirement if necessary.

Positions with as much cover as possible should be chosen, with preservation of complete freedom of maneuver; while the guns themselves should be placed at large intervals, and used with great rapidity of fire, so as to deceive the enemy, if possible, as to the strength of the force opposed to him.

SECTION II.—*The attack.*

863. In general, when large forces are engaged, the attack presents three principal phases:

1. The preparation.
2. The decisive action.
3. Securing the victory, or averting disaster in case of failure.

The use of artillery in the attack will vary in conformity to these different phases.

864. In the preparatory stage artillery has for its objectives those parts of the enemy's force which at the time most oppose the action of our own infantry.

Until our infantry comes within effective small arms fire, the principal target will, therefore, be the hostile artillery.

As the progressive advance of our infantry brings them within effective rifle fire, more attention must be paid to the hostile infantry.

Obstacles, such as walls and abatis, which impede the advance of our infantry should, if possible, be destroyed by artillery fire.

865. The counter batteries acting from masked positions must dominate the enemy's artillery with the greatest possible rapidity; the infantry (breeching) batteries taking, frequently, on account of their more varied rôle, a less defilade than the counter batteries, open upon the hostile infantry and obstacles. The designation of batteries as counter or infantry batteries is not permanent, and may vary with the progress of the engagement.

866. The artillery preparation for the infantry attack is, in general, carried on simultaneously with the infantry advance. If, however, the enemy has fully occupied his position, or the attack is able to form, under cover, close to the hostile position, and thus has only a short distance to cover, the preparation may take place both before and during the attack.

867. Before opening fire with any unit of artillery on any objective, care must be taken to have at hand another unit ready to open upon any of the enemy's artillery which may attempt to prevent the first unit from accomplishing its mission by forcing it to cease firing.

In order to have batteries available for this counter-attack economy of forces must be practiced; no greater force must be used at first than is absolutely necessary.

868. In the decisive attack, a special preparation is necessary. The most rapid and intense concentration of fire of all the available artillery is brought to bear upon the objective against which the infantry is to advance.

During this special preparation the counter batteries continue or resume their fire on the hostile artillery.

Some of the infantry batteries may be sent forward to closer positions as the attack progresses, but it is to be remembered that during such change of positions the fire of these batteries is lost to the assailant at a most critical time, and such changes of position should be avoided if possible. The range and ease of manipulation of the fire of field artillery enables it to dispense with maneuvers which in the last analysis are prejudicial to the infantry which it is charged with supporting.

869. As our attacking infantry reaches the danger zone of our artillery, the commander of the infantry firing line should, by a preconcerted signal, such as the display at the firing line of a conspicuous and suitable flag, inform the artillery commander of the fact. The artillery then increases its range so as to impede the movement forward of possible hostile reserves, and to take the enemy in rear in case he retreats.

870. When the third phase of the attack is reached, accompanying batteries will be designated from the infantry batteries, whose mission will be to reach the captured position as soon as possible after the infantry, in order to pursue with their fire the retreating enemy and to aid in repulsing any offensive return. They should cover with their fire the advance of troops which may be pushing on in pursuit, and break down all efforts of the enemy to reform and renew the fight.

871. In case of reverse, artillery directs upon the enemy's attacking troops every gun which can be brought to bear, in order to destroy their morale and to assist the repulsed troops in the renewed effort which may lead to victory. If the repulsed troops continue to be forced back, the artillery must cover their withdrawal, resisting the advance of the enemy, if necessary, until annihilated.

SECTION III.—*The defense.*

872. The defense requires, before all things, skillful utilization of the available ground in order to develop fire effect to the utmost.

Exhaustive preliminary reconnaissance of the position, improvement of communications within it, determination of the ranges, especially of those to probable artillery positions of the enemy and to points in the probable direction of the infantry attack, are advantages which the defense must utilize so far as time permits.

873. In most cases it will be advisable for the artillery to be held in readiness at first, even if the position has been artificially strengthened. For this alone will insure the artillery meeting the direction of the attack with a correct front and will prevent it being forced to premature changes of position. This also affords the best means of preventing the enemy from gaining an insight into our own dispositions and intentions before the action has commenced.

In preparing positions a most extensive use is to be made of earth cover. If time permits, it is advisable to provide masks and to improve the field of fire by cutting down hedges and trees. It is of the greatest importance to place a large supply of ammunition in readiness in the immediate vicinity of the guns.

As soon as the general direction of the enemy's attack is recognized, but if possible before the enemy brings his batteries into action, the fighting position is occupied. Sometimes flanking artillery fire can be employed with advantage to search dead angles before the fighting position.

874. The commander of the troops will usually order the opening of fire. Firing at excessive ranges and upon small hostile detachments is to be avoided, for this assists the enemy in locating the guns.

875. As a rule, the action will be commenced by engaging the assailant's artillery, and, as a rule, the whole of the defender's artillery will be employed if necessary to attain superiority.

The commander of the forces gives the general instructions for resisting the infantry attack.

When the enemy's infantry advances to the attack, the artillery must make them their target, regardless of the enemy's artillery fire, if necessary leaving cover for this purpose. If possible, the enemy's batteries should at the same time be held in check, but the repulse of the infantry attack must remain the most important feature.

If, before the infantry attack even commences, the enemy's artillery proves itself so superior that it appears hopeless to continue the artillery action, the batteries may temporarily seek cover from the enemy's fire. But as soon as the enemy institutes the decisive attack every gun must at once, even without particular orders, resume the struggle and engage the enemy's infantry only, heedless of his artillery fire. A few batteries, even single ones, thrown into the struggle at fresh unexpected points may be of especial use at this juncture.

876. If, nevertheless, the attack succeeds, part of the artillery must prevent the advance of hostile batteries into the captured position, part must concentrate its fire upon the hostile infantry which has penetrated, and, in cooperation with the reserves, expel the enemy from the captured position. This is one of the tactical situations in which steadfast endurance to the last is imperative and, even if it lead to the loss of the guns, is in the highest degree honorable.

SECTION IV.—*The rear guard.*

877. As the principal duty of a rear guard is to gain time, and as it should be able to withdraw without serious loss it should be strong in field artillery. Positions should be selected so as to utilize the long range of the guns to force the enemy to deploy at the greatest possible distance; such positions must also afford sufficient facilities for withdrawing. In withdrawing, small changes of position should be avoided, the retirements from one position to another being over as great a distance as is consistent with delaying the enemy to the utmost.

SECTION V.—*Horse artillery with cavalry.*

878. On the march, horse artillery should march united and well toward the front of the main body of the cavalry. As a rule, a battery should not be detached with the advance guard.

879. When cavalry meets cavalry, both being mounted, the following principles should govern the horse artillery commander:

(*a*) The position for the guns should be chosen with a view to obtaining the most effective fire on the enemy's cavalry previous to the cavalry charge and to covering with effective fire the area over which our charge is to be made.

(*b*) The position chosen should permit the fire of the guns to be delivered up to the moment of collision and should not hamper in any way the movement of our cavalry.

(*c*) Long-range firing at the enemy's guns is to be avoided.

(*d*) While the opposing cavalry is the most important target, if the enemy's artillery is inflicting losses on our cavalry, it will be necessary to assign batteries to hold them in check. When the fire of our guns becomes masked by the movement of our cavalry, they may all be turned upon the enemy's artillery.

(*e*) If the charge succeeds, the horse artillery should advance as soon as possible; if it fails, the guns should form a rallying point for the cavalry, which should invariably rally in rear of a flank and not fall back directly on the guns.

(*f*) In the mounted combat and in the pursuit by horse artillery, indirect laying has no place.

880. In supporting cavalry acting dismounted, the same principles govern as herein laid down for artillery in the field generally. The extent of front covered leads to wide dispersion

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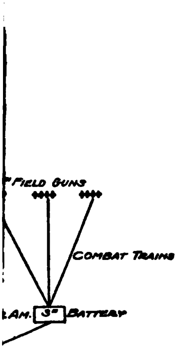
FIELD GUNS
COMBAT TRAINS
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of horse artillery units. Their rôle demands that their action should be characterized by promptness and a readiness to take the initiative. Indirect laying may be used, provided it causes no loss of time.

CHAPTER VII.—AMMUNITION SUPPLY.

881. ***General method of supply.***—Ammunition is supplied to field artillery in campaign in the following manner:

(*a*) The ammunition of the firing battery is replenished from the caissons of the fifth section, which in turn are replaced by caissons from the battery combat train.

(*b*) Combat trains are replenished from the ammunition trains, which in turn are refilled at the advance supply depots. In exceptional cases issues are made direct from depots to combat trains.

(*c*) Advance supply depots are supplied from ammunition depots at the base of operations. For this service the commander of the lines of communication is responsible.

Base ammunition depots are supplied from arsenals.

882. ***Amount of ammunition to be supplied.***—The ammunition on hand at the beginning of a campaign, together with the facilities for manufacturing, should be sufficient to insure the maintenance at all times of at least 1,856 rounds for each light gun.

The following table shows how this ammunition is distributed:

Location.	Rounds per gun.
With the firing battery	190
With the battery combat train	168
With the ammunition train	106
At the advance supply depot	464
Total at the front	928
At the base or in arsenals convenient thereto	928
Total in the theater of war	1,856

Horse artillery operating with cavalry divisions is not usually accompanied by ammunition trains, but replenishes its supply from the nearest division. The limbers of horse batteries are not, as a rule, filled with ammunition.

883. ***Organization of ammunition trains.***—Field artillery ammunition trains vary with the types of guns with which the field artillery brigade of the division is equipped.

One caisson, with the necessary personnel, animals, etc., is provided for each light gun in the field artillery brigade. These caissons, together with the necessary officers, battery wagons, store wagons, field wagons, etc., are grouped together to form organizations of convenient size. As a rule the unit of actual supply to the firing battalion or its combat train is composed of 12 caissons. Two of these units or half batteries, are grouped to form an ammunition battery. The three ammunition batteries of the division form a battalion, which is known as the field artillery ammunition train.

When caissons are not available they are replaced by field wagons. The organization of the ammunition trains is shown in Appendices 4, 5, 6, and 7.

884. ***Position of combat trains and of ammunition trains.***—On the march the battery combat trains march either with their batteries, united in rear of their battalions or regiments, or united in rear of the column. In action the combat trains are generally assembled by battalion and are posted about six hundred yards in rear of the artillery line of battle.

When action is imminent the ammunition train marches, as a rule, in rear of the main body. At the beginning of an engagement the artillery ammunition train is directed to proceed to some suitable location from which practicable routes radiate to the firing batteries. As a rule the most suitable preliminary location is found at a distance of from 2 to 3 miles in rear of the line of firing batteries. Inasmuch as the expenditure of ammunition will not be the same for all the batteries, it is, as a rule, desirable to hold the ammunition train together during the earlier stages of the engagement. As the probable course of the engagement becomes known it may be advisable to subdivide the ammunition train and station the subdivisions at such places as will facilitate the supply of the battalion combat trains.

885. ***Communication.***—The commander of the field artillery ammunition train furnishes an agent to connect the field artillery commander's headquarters with the ammunition train. Similarly, the commander of a subdivision of the ammunition train furnishes an agent to connect with the combat train or with the headquarters of the unit to which the subdivision is assigned.

The commander of a combat train furnishes an agent to connect the headquarters of the unit with the train.

886. *Responsibility for the supply of ammunition.*—The supply of ammunition is effected from the rear to the front. It is the duty of the commander of each unit in the ammunition supply system to ascertain the position of each of the units which he is to supply and to establish contact with such units. Thus, if the ammunition train is to remain intact and is to supply the combat trains of four separate battalions, it is the duty of the ammunition train commander to locate the position of each of the combat trains, reconnoiter the approaches thereto, and to make every arrangement for keeping himself informed as to the needs in ammunition and for the prompt resupply of the combat trains. The troops engaged in battle must be kept free from all anxiety as to the ammunition supply.

The general control of the ammunition supply within the field artillery brigade rests with the brigade commander. The field artillery brigade commander must keep himself informed as to the expenditure of ammunition, and must take the proper steps to replenish the supply from the advance supply depot.

887. *Details as to positions for ammunition trains.*—The position selected for the field artillery ammunition train should afford free access from all directions, should afford ample room for posting the carriages so as to leave room for a third carriage to be driven between any two adjacent carriages, and should be so located as not to interfere with the movements of other troops or trains. If for any reason it becomes necessary to halt carriages upon a road, they must be formed on the right-hand side, leaving sufficient space on the road for the passage of other vehicles.

All routes leading from the position of the ammunition train must be reconnoitered and arrangements made for the probable movements of the train.

888. *Details of ammunition supply in action.*—During a combat the ammunition expended by the guns is replenished from the caissons of the fifth section, generally during lulls in the action. The empty caissons of the firing battery are replaced by caissons of the battery combat train. In urgent cases caissons may be sent directly to the firing battery from the ammunition train.

The ammunition in the gun limbers is ordinarily maintained as a last reserve. The emergency ammunition on the guns is used only in extreme cases and must be immediately replaced.

Empty caissons returning from the firing battery to the combat train are refilled from the caissons of the ammunition train. The filled caissons and the empty caissons are placed alongside of each other and the transfer of ammunition is effected under the direction of the combat train commander. The empty caissons of the ammunition train must be sent back promptly to be refilled. This refilling may take place at the advance supply depot or at some point in advance of that depot. In the latter case the ammunition is brought forward from the advance supply depot in ordinary wagons. In either case the refilled caissons rejoin the train to which they belong.

The position of an ammunition train is marked by a red flag during the day, and by a red lantern at night.

CHAPTER VIII.—TRANSPORTATION BY RAIL AND WATER.

SECTION I.—*Transportation by rail.*

889. Whenever practicable each battery occupies one train with all of its personnel, animals, and matériel complete.

When a battalion is traveling alone, the battalion headquarters detachment may be attached for transportation to one of the batteries of the battalion; when traveling with the regiment, the regimental and battalion headquarters detachments are carried on one train.

890. The following method of loading field artillery carriages is given as a guide, the shortest standard length of flat cars being used. Six such cars are required for the transportation of the carriages of a battery on a war footing:

All trails and poles rest on the floor of the car and all wheels, except those of gun carriages or wagons, are tire to tire.

Cars 1, 2, 3, and 4 each carry a gun section complete and one extra caisson with its limber.

Cars 5 and 6 each carry two caissons and limbers, and either the store wagon or battery wagon with its limber.

891. To load a car carrying a gun section, proceed as follows:

Run on the extra caisson, and place it with the trail pointing toward the middle of the car, the wheels resting about 3 feet from the front end of the car; then place the caisson belonging to the section in a similar position, tires squarely against those of the first; the gun carriage with the trail in the same direction as those of the caissons is next put on, the wheels so placed that no part of the gun or carriage touches the caisson. The three limbers are then put on in the order, or the reverse order, of their carriages, the poles pointing in the opposite direction to the trails. The pole of the first limber is placed under the right trail seat of the gun, the wheels so placed that no part of the limber will touch the gun or carriage.

Each of the other limbers is placed tire to tire with the limber next before it.

The cars not carrying a gun section are loaded in a similar manner, the store wagon or the battery wagon being placed as prescribed for a gun carriage.

If there are but eight caissons only five cars are required, the fifth car carrying only the store and battery wagons with their limbers.

If cars of from 38 to 42 feet in length are used an extra carriage with its limber may be loaded on each car carrying a gun section. The extra carriage and limber are placed as described for the second caisson and limber.

It is important for the safety of the matériel that all trails and poles rest on the floor. It is also deemed advisable to place only one gun on a car, since in case of accident to a single car, one gun at most would be rendered unserviceable.

Two by four scantlings spiked to the floor outside of the wheels prevent lateral movement. Wheels should be chocked front and rear; trails and trail spades box-chocked. If lumber be scarce wheels placed tire to tire may be lashed together, using lashing rope or sash cord, and chocks placed before the wheels of the front carriage and behind the wheels of the rear carriage. Particular care should be exercised in chocking gun wheels. Chocks should be at least 4 inches high.

892. Field wagons and reel carts should be placed end to end, three to a car, wheels chocked, the poles of wagons being detached, if necessary, and reel carts unlimbered.

893. The Quartermaster's Department should be called upon for the necessary 2 by 4 scantling or suitable substitute, and for 5-inch spikes for nailing them to the floors.

894. Advantage should be taken of every halt to inspect the cars carrying animals and matériel, to see that the animals are in good condition and that the loads are riding safely. If necessary, a guard is carried on the flat cars to prevent the unauthorized removal of the tools, etc., from the carriages.

895. The harness is carried in a box car. When harness sacks are available, the harness of each pair is packed in its sack, plainly marked, and stored in the box car. If harness sacks be not available, a paulin may be used to wrap the harness pertaining to a single carriage.

The horse equipments (except nose bags, halter shanks, and saddlebags) of officers and individually mounted men are placed in gunny sacks if practicable (otherwise wrapped in the saddle blankets) and placed in the harness car.

The contents of field wagons and the wagon covers and paulins should be loaded into the harness car.

For long journeys an extra box car may be required for forage.

896. The animals are loaded as follows: Except in hot weather, pack as many animals in the car as possible, as they will ride better than if loosely packed. Sick or injured animals should be loaded in a car by themselves, if it is necessary to take them along, and separate stalls should be provided for them, if practicable. Before loading examine the cars carefully to see that the floor boards are not rotten or broken, that the sides are secure, and that there are no projecting nails or splinters. The cars should be clean and the floor covered with sand or sawdust. In loading animals use, whenever possible, the railroad platform, or the loading ramp found at railroad stations, or, if necessary, make a ramp, well supported and with strong sides. In the field much time and labor may be saved by carrying material for ramps ready prepared on the flat cars with the carriages. Lead the animals up the ramp and into the car, and take off the halter straps. The first animal should be led to one end of the car and the second to the other end, leaving the center of the car for the last animals loaded. Place the animals crosswise, facing alternately the right and left side of the car.

The loading should be conducted quietly, having the animals follow one another promptly, so as to avoid delay. In some cases it may be necessary to blindfold an animal before he can be led into the car. Before loading see that the door on the farther side of the car is closed and fastened, and after loading is completed fasten the second door.

Where cars contain hayracks and water troughs, see that they are in good condition and fill the racks before loading. Animals should be fed hay and watered twice a day; they should be unloaded and exercised, as a rule, once in 24 hours, at which time they should be groomed and fed half rations of grain in the nose bags.

897. The men are carried in passenger cars or in tourist sleepers.

They take with them into the cars their canteens and haversacks (or saddlebags). Their blanket rolls are carried in a baggage car provided for the purpose. A baggage car fitted up as a kitchen car is provided if practicable and if necessitated by the length of the journey; otherwise the men carry cooked rations.

898. General rules for transportation of troops by rail are to be found in Field Service Regulations.

SECTION II.—*Transportation by water.*

899. At sea, transportation of troops is effected by the Army Transport Service.

The necessary preliminaries before embarking, the routine details on board Army transports, and methods of disembarking are prescribed in the Army Transport Service Regulations, a copy of which will be furnished the commander of each organization designated for over-sea service.

900. For over-sea transportation artillery carriages will be knocked down, wheels being removed and guns dismounted. Fuse setters and all implements, equipments, and wheel fasteners should be removed from the carriages and boxed. Harness and horse equipments, except such as are needed for use during the trip, will be boxed and marked to show the section to which they belong. The panoramic sights, quadrants, and the battery commander's telescope will be kept in the personal charge of the battery commander.

The ammunition chests will be emptied and all loose 3-inch ammunition turned in; 3-inch ammunition will be embarked in original packages only.

The men retain in their possession their personal equipments.

Battery wagons, store wagons, reel carts, and signal chests should be fully equipped before embarking and should be stored where they will be accessible. For expeditions into the theater of operations it is obligatory that all of the personnel, matériel, and ammunition of a battery be carried on the same vessel.

901. Horses are led aboard if docking facilities permit, otherwise they are lightered to the transport and hoisted aboard, if necessary, by means of slings or other appliances with which the transport should be provided.

Horses should not be watered or fed for several hours before embarkation.

If it is necessary to disembark at a point where there are no wharves, suitable boats or lighters must be provided by the transport service.

In calm water horses may be lowered into the water or driven overboard from low ports and required to swim ashore.

902. It is the duty of the transport service to provide forage for animals while on board, and for proper arrangements for stabling them.

Special methods for the care and handling of animals on shipboard are prescribed in the Army Transport Service Regulations

PART VII.

CARE OF HORSES AND HORSE TRAINING.

CHAPTER I.—CARE OF HORSES.

SECTION I.—*General provisions.*

903. An important duty of the field artillery officer is keeping his horses in such training and health as will enable them to perform most advantageously the work required of them. That this duty may be properly performed requires careful instruction of the men in the treatment, stabling, management, watering, feeding, grooming, and exercising of the horses, and such continuous supervision and inspection by officers as will insure that instructions are understood and are being carried out.

904. Sore backs and galled shoulders are, as a rule, the result of carelessness or neglect, and usually occur from improperly adjusted saddles or harness, packs not properly adjusted or fastened, or because the men do not sit squarely in their saddles.

At each halt drivers, chiefs of section, and officers should inspect the adjustment of saddles and harness. The shoulders and necks of team horses should also be inspected, and horses showing serious signs of galling should at once be shifted, in the team or with the horse of an individually mounted man.

SECTION II.—*Rules for the care of horses.*

905. All enlisted men must be taught and must thoroughly understand the following rules for the care of horses:

Horses require gentle treatment. Docile but bold horses are apt to retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals.

Before entering a horse's stall and when coming up behind him, speak to him gently, then approach quietly.

Never kick, strike about the head, or otherwise abuse a horse. Never punish a horse except immediately after he commits an offense, and then only in a proper manner.

Give the horse an opportunity to drink before leaving the picket line or stable, and before putting the bit in his mouth. In cold weather warm the bit before putting it in the horse's mouth.

Never take a rapid gait until the horse has been warmed by gentle exercise.

When a horse is brought to the stable or picket line in a heated condition, never allow him to stand uncovered; put a blanket on him and rub his legs, or walk him until he is cool. If he is wet, put him under shelter and rub him with a wisp until dry.

Never feed grain to a horse when heated. Hay will not hurt a horse however heated he may be.

Never water a horse when heated, unless the exercise or march is to be immediately resumed. Sponging out the mouth and nostrils is refreshing to the heated horse and will not hurt him.

Never throw water on any part of a horse when heated.

Never allow a horse's back to be cooled suddenly. To cool the back gradually, remove the blanket and replace it with the dry side next the horse.

Never put the horse up for the night until he is thoroughly clean, especially around his legs, pasterns, and feet.

Individual men returning from mounted duty or pass will report their return to the noncommissioned officer in charge of stables, who will inspect the horse and see that he is properly cared for.

SECTION III.—*Stables and stable management.*

906. Foul air and dampness are the causes of many diseases of the horse; hence the importance and economy of spacious, clean, dry, and well-ventilated stables.

907. The picket line should be established in the immediate vicinity of the stable. The floor of the picket line should be raised, and trenches to carry off the rain should be provided, so that the ground upon which the horses stand may be kept dry.

Paddocks, with shade and water, should be provided near the stables. Bedding racks should be provided near each stable.

908. The stable sergeant takes immediate charge of the stables, picket line and paddock, forage, and stable property in general.

The stable sergeant is responsible that the stables and their surroundings are kept thoroughly policed and free from smells. The stable sergeant is usually assisted by one or more stable orderlies.

Sufficient men are detailed as stable police to secure the general police, and to remove all manure as it is dropped, either in stables, on the picket line, or in the paddocks, during the day. The stable police also assist in the feeding, watering, and bedding of the horses.

909. Manure and foul litter must not be allowed to accumulate in or near the stables, but must be carried to the manure heap daily.

Except at night, all manure will be removed from the stables as it is dropped.

910. The horses are assigned stalls, and places on the picket line, in accordance with their positions in the battery. The stalls are numbered consecutively, and the name of the horse occupying it, and of his rider or driver, is placed over the stall.

If practicable, all woodwork within reach of the horses should be protected with sheet metal or painted with a thin coat of gas tar.

Feed boxes are to be kept clean; they should be washed from time to time and always after feeding bran mash or other soft food.

911. During the day, except in very cold or stormy weather, the horses, when not being used or fed, should stand at the picket line or in the paddocks. In hot climates, however, if there is not sufficient shade on the picket line or in the paddocks, it is better to keep the horses in the stables during the heat of the day.

912. Smoking in the stables or in the immediate vicinity is prohibited.

One or more lights should be provided in the stables at night.

STABLE DUTY.

913. Captains are responsible for the proper performance of stable duty in their batteries. In addition to such stables as may be ordered by the commanding officer, he will require such other duty about the stables and gun sheds as may be necessary to keep the stables, horses, and equipment in proper condition.

It is desirable that stables be held immediately after drill, at which time the horses should be thoroughly groomed. The horses should also be cleaned before going out to drill or other exercise in the morning and in the evening before being led in. All the battery officers should be present at the grooming which takes place after drill. At least one officer should be present at morning and evening stables.

914. The horses are habitually groomed at the picket line.

Each driver grooms his own horses under the direction of his chief of section. Spare horses are groomed by details of cannoneers under the direction of a noncommissioned officer assigned to this duty. The horses of sergeants are groomed by cannoneers who are permanently detailed, at the rate of two horses for each man. Individually mounted men other than sergeants usually groom their own horses. Trumpeters groom their own horses and such others as may be assigned them. Officers' horses are groomed by specially detailed men.

915. The men are marched to the horses, take the position of stand to heel at the direction of the first sergeant, and begin work as soon as the first sergeant commands: ***Commence grooming.***

916. Grooming is essential to the general health and condition of the domesticated horse. Horses improperly groomed, with ragged manes, unkempt pasterns, feet improperly looked after, form an indication of an inefficient organization. Clean horses, properly harnessed and smartly turned out, add to the esprit of an organization and give a fair indication of its discipline and efficiency.

917. To groom the horse proceed as follows:

Take the currycomb in the right hand, fingers over back of comb, and the brush in the left hand, begin on the near side at the upper part of the neck, thence proceed to the chest, arms, shoulders, back, belly, flanks, loins, and rump.

The currycomb is applied gently and is used only when it is necessary to loosen the scurf and matted hair; it is not used on the legs from the knees or hocks downward. The principal use of the currycomb is in cleaning the brush.

To use the brush, the man should stand well away from the horse, should keep his arm stiff, and should lean the weight of his body against the brush.

Having finished the near side, take the brush in the right hand and the currycomb in the left hand and begin on the off-side.

Having done with the brush, rub or dust off the horse with the grooming cloth, wipe about the eyes and nostrils, arrange the mane and tail, and clean the dock. The skin under the flank and between the hind quarters must be soft, clean, and free from dust.

Finally, clean the hoofs.

918. The wisp is used when the horse comes in wet and also for stimulating the coat.

The wisp should be worked forward and backward well into the coat, so that full advantage may be obtained from the friction. After finishing with the wisp the coat should be laid flat.

Hand rubbing is beneficial. When a horse has had very hard, exhausting work, his legs should be hand rubbed and afterwards bandaged. An exhausted horse should also be given stimulants and warm gruel.

919. The value of grooming is dependent upon the force with which the brush is used and the thoroughness with which the other work is done.

Officers and noncommissioned officers should, by continuous personal supervision, see that the grooming is properly done.

No horse should be reported in order until he is thoroughly clean; his mane plucked, brushed out, and laid flat; his eyes and nostrils wiped or washed; his sheath washed with castile soap and water when necessary; and his coronet and hoofs put in order. The pasterns and that part of the mane where the crownpiece of the bridle rests should be neatly trimmed.

At each stables the horses' feet are to be thoroughly cleaned out and the shoes carefully examined. Horses requiring shoeing are reported to the proper noncommissioned officer, who notifies the stable sergeant.

Each horse should be inspected by an officer before the man who has groomed him is permitted to leave. If any horses are not properly groomed at the completion of stables, they will be left at the picket line and groomed by their drivers under the direction of a noncommissioned officer.

920. At the stables held after the return of organizations from drill harness should be wiped off and collars and bits cleaned.

In the weekly cleaning of harness and other leather equipment all buckles will be undone and the parts of the harness separated before the cleaning begins.

921. In the morning, stalls are cleaned out and the stables policed under direction of the stable sergeant.

The bedding is taken up, carefully shaken out, and sorted. All parts of the bedding which can be used again are taken to the bedding racks and spread thereon for a thorough drying; parts which can not be used again are sent to the manure heap. In the evening the dried bedding, mixed with such fresh straw or bedding as may be necessary, is laid down. The bed must be soft and even, with the thickest part toward the manger.

FEEDING.

922. Horses should be fed three times a day—at reveille, in the middle of the day, and at night. One-third of the grain ration is fed at each of these times. Hay, as a rule, is not fed in the morning, but about one-third of it should be fed at noon and the remainder at night.

The use of bran once or twice a week is important for stabled horses. In spring or early summer they should be grazed. A lump of rock salt should be kept in each manger.

923. Before feeding hay it should be thoroughly shaken up with a fork so as to get rid of dust and seed; it is also advisable to moisten the hay before giving it to the horse. The grain, if possible, should be run through wire screens so as to take all dust out of it.

It is advisable to feed at least a portion of the noon and evening allowance of hay before feeding grain.

Grain should never be fed or placed in the mangers until it is certain that the horses are thoroughly cool.

In the morning the horses are usually fed at, or before, reveille. The noon feed of hay is usually placed in the mangers while the organization is at drill, but the grain is not fed until the horses are thoroughly cool. The evening feed is placed in the mangers after the stable has been thoroughly policed for the night.

All horses do not require the same amount of forage; the amount given each horse must be based, therefore, upon his individual requirements.

When forage can not be obtained, grazing should be allowed at every spare moment, especially early in the morning when dew is on the grass.

924. All forage received by an organization should be inspected and weighed by an officer of the organization. All officers should be familiar with the characteristics of good forage. To obtain this knowledge, officers should be encouraged to visit large commercial stables.

The daily allowance of oats, barley, or corn is 12 pounds for each horse; that of hay, 14 pounds. The allowance of straw for bedding is 100 pounds per month for each animal.

WATERING.

925. Except when they are heated, it is desirable that horses should have free access to water at all times. As this is usually impossible, it becomes necessary to water at stated times.

Horses should be watered before rather than after feeding; an exception may be made in the case of the early morning feeding, as horses rarely drink very much in the early morning.

926. A horse requires from 5 to 15 gallons of water daily, depending upon the temperature and the work done by the horse. Except in very cold weather, horses should be watered at least three times daily—at morning stables, before the noon feeding, and before the evening feeding. In warm weather, water drawn from a cold well or spring should be allowed to stand long enough for the chill to pass off before the horse is allowed to drink.

On the march the horses are usually watered from the buckets carried on the carriages; the oftener the animals are watered the better, especially as it is not usually known when another watering place will be reached.

927. Horses must be watered quietly and without confusion; the manner in which this duty is performed is a good test of the discipline of a mounted command.

The horses are to be led or ridden at a walk to and from the watering place. No crowding must be allowed at the watering place, nor must any horse be hurried or have his head jerked up from the water.

The horses are watered under the immediate direction of the senior officer or noncommissioned officer present at stables or at other time of watering; an officer should always be present when the horses of other commands are liable to be met at the watering places.

SICK HORSES.

928. Horses on sick report are under the immediate charge of the stable sergeant.

When a veterinarian is present, he should prescribe the treatment to be given sick horses, and he should inspect all sick horses at least once daily.

The veterinarian should also visit all the horses at least once a day, at one of the stated stables; he should be freely consulted as to minor ailments and as to means whereby the horses may be kept in fit condition.

In the absence of a veterinarian the sick horses are treated by the stable sergeant under the direction of the captain.

929. Serious disease is best avoided by immediate and constant attention to minor ailments, galls, etc.

If a horse sustains an injury, neglects his food, refuses water, or gives any evidence of sickness, his condition should be reported at once to the stable sergeant. It is the duty of any enlisted man observing such condition to make the necessary report.

SHOEING.

930. Horses will be shod according to the principles outlined in the authorized manual.

All officers must understand the principles of proper shoeing, and must supervise the work of the horseshoers, being especially careful to see that the knife is not used improperly.

CHAPTER II.—TRAINING OF ARTILLERY HORSES.

SECTION I.—*Object and sequence of instruction.*

931. The artillery horse is a combination saddle and draft animal. When received in the battery he has usually been ridden and broken to harness. Additional training is, however, necessary to fit him for his work in the artillery, since he must develop into a fairly good saddle horse and at the same time must learn draft in the artillery harness.

932. His training, therefore, is of two distinct kinds:

1. Training for saddle.
2. Training for draft.

The two kinds of training will at first be given independently, but in order to hasten progress, they will be carried forward simultaneously. Later on they will be combined.

SECTION II.—*General principles.*

933. In garrison, artillery horses should receive a thorough training; in the field they will receive such as circumstances permit. But in either case it must be constantly borne in mind that draft and not saddle qualifications are of paramount importance.

934. Horses upon their arrival should be isolated a sufficient time to prevent the spread of any contagious or infectious disease to other animals. Following this, they should still be carefully watched during the period of acclimation and adaptation to military life. Thereafter their systematic training is taken up.

935. If, at any time during the training, the horse gets out of condition or develops blemishes or unsoundness, he should be given only such training or exercise as may be suitable to his condition. Special care should be taken with the very young horse to avoid developing slight blemishes into defects which later may render him unserviceable.

936. A horse learns by constant repetition of a lesson, coupled with the hope of reward and the fear of punishment. Great patience and good judgment should be used by the trainer in inflicting punishment. The usual rewards are caresses, rests succeeding obedience, dropping reins, relaxing pressure of the legs, dismounting, etc. The usual punishments are persistence in the use of the aids, employment of the spur, and finally the exceptional use of the whip. No precise rules for inflicting punishment can be laid down; the trainer must be guided by his experience and best judgment, bearing in mind that faults of execution must be corrected with gentleness and patience.

937. Most of the movements hereafter described must for a long time be executed in the same order until the horse is confirmed in his knowledge of the effects of the aids and of the bit by constant repetition. In this way laborious obedience finally becomes confirmed habit.

938. Analysis shows that all possible movements at all possible gaits are produced by combinations of four elementary actions: Pressure of the legs, causing the horse to move forward; tension of the reins, causing the horse to check his speed or to move back; control of the forehand by the reins; control of the haunches by the rider's legs. The horse when purchased usually understands the tension of the reins; the other three actions are rarely understood by him at that time, and are learned only as the result of continued careful training. These actions must be thoroughly understood by the horse separately before they are combined.

939. The length of the training necessarily varies with the age of the horse at date of arrival, his previous training, the skill of the trainer and special conditions facilitating or retarding the work; but normally the period should be about three months.

High spirits in the horse must not be mistaken for signs of viciousness, nor must they be controlled by violent means. Only unsatisfactory results will follow the training of horses that are short of work; in this case the horse should be at once given sufficient exercise or work on the longe before proceeding further with his training. The opposite extreme of overwork, resulting in dullness, must also be avoided. As a general rule the training should occupy from two to four hours per day.

940. The horse should be early accustomed to military sights and sounds, such as troops of different arms, bands, firing, etc. To accomplish this the horse should be led, accompanied by one or more quiet, fearless horses, toward the object or sound, and be brought gradually nearer, until, as he becomes accustomed to it, unaccompanied by other horses and standing still, he shows no signs of fear.

When a horse shows signs of fear he should be quieted but never punished.

941. Effort should be made to develop in each battery a number of men as horse trainers. They should be men of even, quiet dispositions, good riders and drivers, and also good horsemen, familiar with the care, handling, and training of horses.

While suggestions are given herein as to methods, it is to be remembered that officers must, by the study of the best authorities and by practice, develop the methods to be used in each particular case.

SECTION III.—*Training for saddle.*

942. ***Definition and object of horse training.***—By horse training is meant a series of exercises that render the horse obedient, while preserving and developing his inherent qualities. Its object is, therefore, not only to master and control the instincts of the animal, but also to subject him to a muscular training which will supple and strengthen all parts of the body. As a result, his gaits will be developed by the harmony of his movements and by the exact distribution of his weight produced under the influence of the aids.

943. ***Three periods of training.***—The training of a young horse may be divided into three periods:

1. Preliminary work.
2. Work in the snaffle bridle.
3. Work in the double bridle.

944. ***Preliminary work.***—In this period the horse is gentled. He is taught to allow himself to be saddled and mounted, to go straight ahead at the walk and trot, to turn to the right and to the left.

Work on the longe should be taken up in this period.

Under certain circumstances and with certain horses, outdoor work may be begun.

945. ***Work in the snaffle bridle.***—The horse is first brought to a thorough understanding of the effects of the legs. He is next taught to obey the simple effects of the snaffle.

At the end of this period the horse should understand work at the three gaits on the straight line, the diagonal, and the circle; he should also know how to take the gallop with either lead.

In the second period outdoor work should be continued or begun.

946. ***Work in the double bridle.***—All work with the snaffle is repeated with the double bridle. Instruction is completed as regards the use of the aids. The horse is confirmed in his work at the gallop and finally is taught the change of lead.

It is at this point that ordinary training stops.

947. ***Exercise by leading.***—When young horses arrive at the station they should be placed together in the best available stable and turned over to men selected as trainers. (Par. 934.) All precautionary and hygienic measures should be taken to gradually accustom them to changed conditions and to handling by men.

Young horses should be exercised daily; at first by men on foot and later led beside trained horses. This exercise, which is at a walk, is of great advantage not only to strengthen the animals but to quiet them by making them familiar with outdoor objects. The horses should not always be led on the same side; if this is done they eventually acquire a false set of the neck, which should be avoided by leading them on the left as well as on the right.

948. *Longeing.*—This work will be of great service in horse training, provided, however, that the longe is used as a means of training and not as a medium for fatiguing exercise.

The following principles must govern in this work:

1. The horse should be controlled by the longe and not by the whip; the only function of the latter is to move the horse forward.

2. The length of the longe should be frequently changed, requiring the horse alternately to stretch himself on a large circle and to bend himself on a small circle.

3. The gaits should be frequently changed and the horse brought to the walk from time to time, in order to avoid the stiffness of gait that would otherwise result.

949. *The cavesson.*—The cavesson is a light halter with the brow band, throatlatch, and cheek pieces like the bridle headstall, and has a noseband that may be adjusted with a buckle; there is also a ring on the noseband for the longe. The longeing rope is from 20 to 30 feet long.

The noseband should be placed about 3 inches above the nostrils, so as not to affect the breathing; it must not be buckled so tightly as to make the horse uneasy. It should act both as noseband and curb.

950. *To longe the horse.*—The horse is first led several times around the circle at a walk. An assistant with a whip follows at a short distance and shows the whip occasionally when the horse hangs back; if this does not produce the desired effect, he should strike the ground in rear of the horse or touch him lightly with the whip until he obeys. When the horse moves freely at the walk, the trainer should gently urge him to trot and gradually lengthen the rope without attracting the animal's attention; he should continue to go round the circle at an active pace, nearly opposite the horse's shoulder, so as to keep him out and urge him forward.

If the horse takes kindly to this lesson, the trainer may lengthen the longe by degrees until he has only to turn in the same spot, the assistant keeping the horse out to the line of the circle.

If the horse breaks his pace or plunges, the rein should be shaken horizontally without jerking until he returns to the trot.

The trainer should have a light and easy hand with the longe. For the first two or three days the horse must not be urged too much; if he goes quietly, without jumping or resisting, enough has been accomplished. He should be longed to the right, to the left, and to the right again, changing the gait from the trot to the walk and back again in each case. He should be frequently halted by gently feeling the rein and speaking to him, always making use of the same words, such as ***whoa.*** At the conclusion of each lesson the rein should be carefully shortened and gathered up in the hand, and the horse brought to the center of the circle and caressed before being dismissed.

After a few days of the above practice, the horse may be urged a little more in the trot, but great care is requisite to teach him to use his legs without straining them. Much harm may be done at this stage of the instruction by a sudden jerk or a too forcible pull on the longe.

The lessons should not be made so long as to fatigue or fret the horse, being gradually increased in length as the instruction progresses.

951. Work on the longe may be used with advantage:

1. To exercise young horses without injury and without fatigue to the joints.
2. To give first lessons to horses difficult to manage.
3. For horses that hold back or fight.
4. For horses with one shoulder more developed than the other.
5. For those that will not work equally well on either hand.
6. For horses that bend themselves with difficulty.

952. ***Precautions in saddling.***—In order to accustom young horses to their equipment, they should be saddled during the period when they are exercised by leading. The saddle is put on without stirrups or stirrup straps; it must not be placed too far back, and at first the girth should be tightened only slightly. The girths are readjusted during the exercise.

With nervous horses, it will be well to use the longe to quiet them by a little work before placing the saddle on the back.

After the horse has become accustomed to the saddle and the girth, the stirrups should be replaced and allowed to hang down on each side during several exercises. In this manner the horse will be prepared for the lesson in mounting, which thereby becomes more simple; he should not be saddled and mounted for the first time on the same day.

953. *Mounting lesson.*—At first the rider should get into the saddle as quietly as possible.

The lesson should not be given until the horse has been worked for some time or at the end of his work. An assistant stands in front of and facing the horse.

The trainer approaches the horse's head, caresses him on the forehead, on the eyes, the neck, and the haunches. He slaps the saddle, pulls the stirrups out and lets them drop back; he then grasps the reins, leaving them very long. He mounts the horse without hurry, but also without hesitation.

If, during the lesson, the horse backs or moves away, the trainer returns to the animal's head, leads him forward a step or two with the snaffle reins, and quietly begins the lesson anew.

After seating himself in the saddle the trainer should use his right hand to assist in engaging the off stirrup. By feeling for the stirrup with the toe there is danger of frightening the horse by touching him unintentionally with the leg or stirrup.

954. *Importance of the straight-ahead movement.*—It is of the first importance that the horse go freely straight ahead. The lesson with this object in view must be the first of all mounted lessons; from the beginning of training the horse must be accustomed to yield to the action of both legs. This is essentially a sign of docility; the full or the limited obedience of the horse to the action of the legs will be an indication of a brief or protracted period of training.

955. *To accustom the horse to go straight ahead under the action of the legs.*—This lesson should be repeated during the whole period of training. For the first occasion observe the following rules:

Never keep the lower leg glued to the horse's flank, but use repeated taps with the calves.

Tap the horse near the girth and do not reach too far back.

Begin by giving the lesson when passing from the walk to the trot, and then when lengthening the trot.

Anticipate and assist the action of the legs, if necessary, by the use of light taps with the whip.

These rules are especially applicable to riding-hall lessons, for in outside work on the road young horses have a natural tendency to go straight ahead, following the old horses at the head of the squad.

956. ***The principle of constant tension on the reins.***—During the first weeks of training the trainer should be careful to keep a constant light tension on the reins. Later on, when the horse has become accustomed to the pressure of the bit and to the idea of going straight ahead, he will, of his own accord, keep the reins taut.

957. ***How to halt a young horse.***—Lean back slightly and pull on the reins with gradually increasing force, in order to slow and then stop movement.

When the trainer pulls on the reins, the horse should neither raise nor lower the head. The muzzle should remain to the front, and the whole mass of the neck should move back toward the withers. In other words, under the action of the reins the horse should neither throw his nose up in the air nor bring it down against his chest. This latter fault is particularly to be avoided. It is more difficult to raise the muzzle than to lower it, and any horse that at the beginning of training withdraws from neck control becomes especially difficult to instruct.

958. ***The change of direction.***—To change direction to the right, open gently the right rein by carrying the wrist to the front and right, without moving the elbow and without twisting the hand.

The effect of opening must be produced laterally and as little as possible from front to rear. It induces a movement of the haunches and furnishes therefore a preliminary means of accustoming the horse to yield to the pressure of one leg.

To change direction to the right, then, the aids to be used are the right rein and the right leg.

In the first lesson the turning movement will not be executed with precision, but this is of small importance. All that is necessary is to make the horse understand what action results from the opening of one rein and the closing of one leg.

959. ***First suppling of the haunches.***—Having been taught to move straight to the front under the action of both legs, the horse is then taught to yield to the effect of one leg, carrying the haunches to the right or left. This second lesson, which necessitates the crossing of the hind legs and gives mobility to the hind quarters, is most useful for suppling the horse.

The best way to give a horse this second lesson is to use abouts on the forehand made while marching. For example, marching to the right hand, leave the track on a diagonal (oblique) and return to it by a half turn to the left, exacted by a very pronounced action of the left leg and left rein. This carries the horse's haunches to the right; that is to say, the horse while still gaining ground yields to the effect of the left leg and left rein and thus describes a half turn. The same movement is also executed while marching to the left hand and the horse eventually swings the haunches easily about the forehand, without either increase or decrease of gait.

960. *Haunches in.*—This movement, which continues the suppling of the croup, has the further advantage of confirming obedience to the legs. Marching on the right hand, indicate opposition with the left rein and at the same time close the left leg. If the horse yields and swings the croup inside of the track by even one step while still gaining ground to the front, straighten him again at once with the right rein and leg. Repeat this swinging of the haunches several times, but in the first lessons do not insist. Gradually lengthen the time before straightening.

961. *Supplying the forehand.*—The hind quarters having been trained by the foregoing work, the training of the forehand must follow at once in order that both ends of the horse shall be in harmony as regards mobility and suppleness.

962. *Shoulder in.*—This is the starting point in forehand suppling. It furnishes the means of bending the forehand and spinal column and of training the fore legs to cross each other easily, and is executed as follows:

Marching to the right hand, open the right rein as in changing direction to the right, and press the left rein upon the neck. Close the right leg, and slip the left leg behind the girth to restrict as much as possible the swinging of the haunches.

The support of the left rein is indispensable in order to keep the proper balance of the shoulders.

The horse's head must be firmly held between the two reins, otherwise the exercise would become a lateral flexion of the neck and would do more harm than good.

963. ***About on the haunches.***—This is a difficult movement and should not be taken up until after the exercises *haunches in* and *shoulder in.*

To execute the about the trainer maintains the haunches in place by pressure of the outside leg and turns the forehand by the reins.

The inside hind leg is as nearly in place as practicable, the outside hind leg gaining ground around it.

964. ***Bending lessons on the snaffle.***—It is better to take up bending lessons on the snaffle too late rather than too soon. When the horse bears properly on the bit, and not before, he should be taught to yield the jaw and to place the head to the right or left.

In preliminary bending lessons, to draw the head to the right, the trainer pulls gently and slowly upon the right rein, and holds the left rein steady to regulate the amount of displacement of the head, as well as to prevent, as far as possible, any bending of the neck; the head alone should be turned to the right. During the movement the head should be held high, rather than low, and vertical, and should be turned only slightly to the right or left; the jaw should remain flexible.

965. ***The gallop.***—The time for taking up the first work at the gallop can not be definitely fixed; it depends upon the conformation of the horse, his condition, his leg development, and the kind of ground available. Generally the lesson should be begun early, as it serves as an additional means of suppling the horse, of strengthening him, of extending him, and pushing him straight ahead.

The best means of teaching a horse the gallop is by increasing the gait from the trot on a circle. He is thus taught to work equally on both sides, and to lead with the proper foot. The aids to be used are both legs and the outside rein. The legs, by steadily forcing an increased gait, push the horse into the gallop.

A slight tension on the outside rein prevents the horse from swinging the haunches out, and consequently prevents a false lead or a disunited gallop.

966. ***Backing.***—The first lesson in backing may be given dismounted and in the following manner:

Stand on the left side of the horse, with the reins in the left hand and the whip in the right; make him move the hind quarters by a touch with the whip, and take advantage of this mobility to force him one or two steps backward.

The horse should be made to move to the front again immediately by leading him forward with the left hand and, if necessary, by touching him lightly with the whip.

To give this same lesson mounted, begin by closing the legs as in moving to the front; then relax the legs and move the horse backward by leaning back slightly and by pulling on the reins with gradually increasing force.

967. ***To passage.***—Gather the horse, move his head and shoulders in the desired direction by the reins and his haunches by the rider's legs, keeping the head and shoulders slightly in advance of the haunches and the neck in prolongation of his body. Require only a few steps at a time.

968. ***The double bridle.***—In the first lessons in the double bridle, work should be begun on the snaffle bit. When the horse has settled down and is well in hand, he may be ridden on the curb. It is important to remark that bending lessons are never to be given in the early stages of work on the curb. For these lessons it is advisable to wait until the horse fearlessly accepts contact with the bit and tightens the curb rein as he formerly did the snaffle reins.

To attain this bearing on the bit the following method should be used:

1. Ride the horse on the snaffle with the reins in both hands, placing the snaffle rein outside under the little finger, allowing the curb rein to hang loose.
2. Working at first at a walk and later at a trot, ride the horse with the curb rein alone; the reins may be held in one hand or in both hands.
3. Finally adopt the ordinary method of holding the reins in one hand.

969. ***Bending lessons.***—The object is to supple the muscles of the neck and jaw and to teach the horse to carry his head properly placed. Every effort should be made to get the bend in the neck at the poll and not near the withers. The horse is equipped with the double bridle. The trainer is dismounted and with his left hand holds both snaffle reins a few inches in front of and above the horse's jaw, while playing the curb reins held in his right hand a few inches back of the jaw. Great patience is necessary. The slightest yielding of the muscles should be rewarded by caressing the horse. The lesson should be continued only a few minutes at a time.

When the horse obeys the trainer dismounted, the lesson should be given mounted, the trainer holding up the head with the snaffle reins, and playing the curb reins lower down. The lesson should ultimately be given with the horse in motion.

The importance of these lessons in producing a well-balanced horse with a good carriage can not be overestimated.

Bending lessons by turning the neck sideways should not be given.

SECTION IV.—*Training for draft.*

970. The object is to so train the horse that, when harnessed in any position in the team, he will perform his full part in moving the carriage completely equipped and loaded with ammunition, over any terrain practicable for artillery, and will be at all times and under all circumstances under perfect control of the driver.

971. If difficulty is anticipated with the new horse, he should be led or longed harnessed before putting him in a team. In either case a wheel harness should be used, as this accustoms him to the breeching.

When the harnessed horse is not attached to a carriage during training he should not be worked at a trot for such a length of time that the collar will bruise his shoulders or make them sore.

972. When first placed in a team, the horse should be used to replace the off swing horse in a well-trained team, and if he does not pull, he should be allowed to trail along. Any sudden or violent action on the part of the driver, that would cause the horse to jump against his collar, must be carefully avoided, or the horse will bruise his shoulders and always fear the collar.

973. When the horse has become accustomed to his surroundings and manifests a willingness to pull his share of the load as off swing horse, he should then be used as off lead and off wheel horse, and his training completed by working him in all positions on the near side. In all such training a caisson without ammunition should be used, and on level ground only.

974. When the horse works freely in any position in the team with an empty caisson on level ground, the difficulty of draft should be gradually increased by the use of the brakes.

This training should be followed by work over more difficult ground and with loaded carriages.

Particular attention should be devoted to training the horse to climb steep hills; but care must be taken to avoid giving him tasks beyond his strength. This is especially the case with a spirited horse which may easily, through errors of judgment on the part of the driver, be made into a balker. The most difficult haul is up a steep side hill, where the carriage slews.

All difficult tasks will be approached quietly, the driver avoiding any unnecessary noise or excitement.

975. Horses in heavy draft require the firm support of the reins; this is especially the case when the footing is at all uncertain.

Horses when pulling well should never be struck with the whip; if they manifest a disposition to quit, they may be threatened at the particular instant of stopping. They should not be allowed to jump against the collar, as this bruises the shoulders. The load should be moved by the quiet and simultaneous action of all the horses of the team.

976. Artillery horses should never be allowed to jump obstacles similar to those which they may have to cross in harness. If trained to jump such obstacles, they will do so in harness, with the result that each pair will plunge in turn against the collar as they attempt to clear the obstacle, thereby bruising the shoulders and bringing an excessive strain upon the harness. The horses should be taught to scramble through or over small obstacles, such as shallow ditches, etc., the drivers being careful to see that the team preserves the gait and that each horse maintains his footing and keeps his shoulders against the collar.

977. As a general principle, horses under 7 years of age should habitually be employed as off horses, but they will be trained to work in any position in the team or as individual saddle horses.

978. Other guiding suggestions are that, on account of the extra work of the wheel pair in holding back the carriage on down grades and in stopping and turning it, the heaviest and strongest horses should be placed in this pair; in any pair the horse of the better saddle conformation should be the near horse, and the freer driver should be the off horse; the horses of a pair should have as nearly as possible the same conformation.

PART VIII.

CEREMONIES.

CHAPTER I.—GENERAL RULES.

979. On occasions of ceremony, except funerals and reviews of large forces, troops will be arranged from right to left in line, and from head to rear in column, in the following order: First, infantry; second, field artillery; third, cavalry. Artillery, engineer, and signal corps troops, equipped as infantry, are posted as infantry; dismounted cavalry and marines attached to the Army are on the left of the infantry in the order named; companies or detachments of the hospital corps and mounted detachments of engineers are assigned to places according to the nature of the ceremony; mounted companies and detachments of the signal corps are posted as cavalry. When cavalry and field artillery are reviewed together without other troops, the artillery is posted on the left. Troops in column in funeral escorts will be arranged from head to rear in the following order: First, cavalry; second, field artillery; third, infantry. In the same arm, regulars, militia in the service of the United States, and volunteers are posted in line from right to left, or in column from head to rear, in the order named. In reviews of large bodies of troops the different arms and classes are posted at the discretion of the commanding general, due regard being paid to their position in camp. On all other occasions troops of all classes are posted at the discretion of the general or senior commander.

980. At formations for ceremony in which field artillery organizations of different types take part, they are formed in order from right to left in line, and from front to rear in column, as follows: Horse artillery, light artillery, heavy artillery, mountain artillery.

981. At formations for ceremony sabers are drawn. At ceremonies mounted the pieces are in front unless the formation is in double section; cannoneers mounted on the chests fold their arms. Mounted officers in facing toward the line and in resuming their front always execute a left about.

Staff and noncommissioned staff officers, when it is not otherwise prescribed, draw and return saber with their chief.

CHAPTER II.—REVIEWS.

SECTION I.—*General rules.*

982. The adjutant or the adjutant general posts men or otherwise marks the points where the column changes direction in such manner that the right flank in passing the reviewing officer shall be about 10 yards from him.

983. The post of the reviewing officer, usually opposite the center of the line, is marked by a flag.

The reviewing officer should be at the flag before the head of the column reaches that point; before that time he may take any position to observe the movements of the troops.

984. The reviewing officer, his staff, and others accompanying him, salute the standard by uncovering, whether the standard salutes or not; the reviewing officer returns the salute of the commanding officer of the troops, and of such commanding officer only.

985. At reviews the commanding officer of the troops, and the members of his staff accompanying him, will return saber after turning out of the column and placing themselves on the right (or left) of the reviewing officer and his staff, and will draw saber after the commanding officer salutes the reviewing officer preparatory to returning to the command.

986. The staff of the reviewing officer is in single rank, 6 yards in rear of him, in the following order from right to left: Chief of staff, officers of the general staff corps, adjutant general, aids, then the other members of the staff in the order of rank, the senior on the right; the flag and orderlies place themselves 3 yards in rear of the staff, the flag on the right.

987. Officers of the same or higher grade and distinguished personages invited to accompany the reviewing officer place themselves on his left; their staffs and orderlies place themselves respectively on the left of the staff and orderlies of the reviewing officer; all others who accompany the reviewing officer place themselves on the left of his staff, their orderlies in rear. A staff officer is designated to escort distinguished personages and to indicate to them their proper positions.

988. When riding around the troops, the reviewing officer may direct that his staff, flag, and orderlies remain at the post of the reviewing officer or that only his personal staff and flag shall accompany him; in either of these cases only the commanding officer accompanies the reviewing officer. If the reviewing officer is accompanied by his staff, the staff officers of the commander place themselves on the right of the staff of the reviewing officer.

While passing in review or riding around troops a staff is formed in one or more ranks, according to its size.

989. The staff, flag, and orderlies of brigade commanders place themselves in the order prescribed for the staff, flag, and orderlies of the reviewing officer.

990. When the reviewing officer is not in front or in rear of a regiment, its commander may cause it to stand ***at ease,*** to ***rest,*** or ***to dismount*** and ***rest,*** and to resume ***attention*** and ***mount,*** but so as not to interfere with the ceremony.

991. When the commanding officer of the troops turns out of the column, his post is on the right of the reviewing officer; his staff, in single rank, on the right of the staff already there; his flag and orderlies in rear of his staff.

When the column has passed, the commanding officer, without changing position, salutes the reviewing officer and then with his staff and orderlies rejoins his command.

If the person reviewing the command is not mounted, the commanding officer and his staff, on turning out of the column after passing the reviewing officer, return saber and dismount preparatory to taking post on the right of the reviewing officer and his staff. In such case the salute of a commanding officer, prior to rejoining his command, is made before remounting.

992. Battalion commanders repeat the commands of their regimental commander.

Whenever the colonel faces the line to give commands, the majors face at the same time; they resume their front after seeing the movement executed. All such commands are executed when they have been repeated by the majors. When the command is ***Present saber,*** the lieutenant colonel and the colonel's staff salute at the command of the colonel; the major's staff salutes at the command of the major; the colonel and majors salute after resuming their front; each staff returns to the carry at the command of its chief. The same rules apply to the colonels and majors and to the general's, colonel's, and major's staffs whenever the brigade commander faces the line to give commands.

When passing in review, the staff of each commander salutes and returns to the carry with him.

993. When the general, the colonel, or the major faces the line to give commands, the staff and orderlies do not change position.

994. Each guidon and, when the rank of the reviewing officer entitles him to the honor, each standard salutes at the colonel's command, ***Present saber;*** and again in passing in review when 6 yards from the reviewing officer. The standard and the guidons are raised at the command, ***Carry saber,*** or when they have passed 6 yards beyond the reviewing officer.

995. The band of each regiment plays while the reviewing officer is passing in front of and in rear of the regiment.

During the march in review each band, immediately after passing the reviewing officer, turns out of the column, takes post in front of and facing him, continues to play until its regiment has passed, then ceases playing and follows in rear of its regiment; the band of the following regiment commences to play as soon as the preceding band has ceased. The musicians of each regiment, except those pertaining to the regimental and battalion commanders, are consolidated in rear of the band.

If the band be not present the musicians of each regiment, with the exceptions above noted, are consolidated and posted in double rank in a position corresponding to that of the band. They conform to what is prescribed for the band, the chief trumpeter taking post and performing the duties of the drum major.

In a single battalion when no band is present the musicians of the battalion, with the exception above noted, are formed in single rank and posted as prescribed for the musicians of the regiment, conforming to what is prescribed for them.

996. If the rank of the reviewing officer entitles him to the honor, the march or flourishes are sounded by the musicians when sabers are presented, and sounded again in passing in review at the moment the standard salutes, by the musicians halted in front of the reviewing officer.

Musicians with the regimental or battalion commanders do not sound the march or flourishes.

997. The formation for review may be modified to suit the ground, and the present arms and the ride around the line by the reviewing officer may be dispensed with.

998. If the post of the reviewing officer is on the left of the column the troops march in review with the guide left; the commanding officer and his staff turn out of the column to the left, taking post as prescribed above but to the left of the reviewing officer.

999. Field artillery passes in review at a walk, trot, or gallop. When passing at the trot or gallop no salutes are made except by the commander of the troops when he leaves the reviewing officer.

1000. When the command is to pass at an increased gait the band (or musicians if no band be present) remains in front of the reviewing officer and continues to play until the column has completed its second change of direction after passing the reviewing officer. As soon as the increased gait is taken up by the column the band plays in appropriate time, ceasing when the column has again completed the second change of direction after passing the reviewing officer. Upon the completion of the review, the band returns to the position it occupied before marching in review or is dismissed, as may be directed. If there be more than one regiment the band of the last regiment in column remains in front of the reviewing officer; the others turn out of the column when the increased gait is taken up by their respective regiments, and rejoin them, or are dismissed on the termination of the review.

1001. In reviews of brigades or larger commands each battalion, after its rear has passed the reviewing officer 50 yards, takes an increased gait for 100 yards in order not to interfere with the march of the column in rear.

The troops having passed the reviewing officer, return to their camps by the most practicable route, being careful not to delay the march of the troops in rear of them.

1002. When field artillery is reviewed in line with cavalry or infantry, it is formed in line with the lead drivers of the pieces aligned on the front rank of the infantry or on the rank of cavalry.

This line is marked by the guidons who precede the batteries on the line, where they are established by the adjutant.

At the command ***Close ranks, March,*** with infantry, or ***Attention, Posts,*** with cavalry, the artillery commander commands: 1. ***Attention;*** 2. ***POSTS***. The chiefs of platoon and standard bearer resume their posts in line.

The reel carts, battery wagons, store wagons, and field wagons do not accompany field artillery at reviews. If there be no inspection, the mechanics may be assigned for duty as cannoneers.

1003. When it is necessary that an organization should be reviewed before an inspector junior in rank to the commanding officer, the commanding officer receives the review and is accompanied by the inspector, who takes post on his left.

SECTION II.—*Battalion review.*

1004. The battalion being in line, the major faces to the front; the reviewing officer takes his post; the major turns about and commands: 1. ***Prepare for review;*** 2. ***MARCH.*** The staff remains in position, facing to the front.

At the command ***March,*** the chiefs of platoons, and the standard bearers if present with the standards, move up on the line of captains. Noncommissioned officers acting as chiefs of platoon do not move up on the line of captains.

The major then faces to the front.

The reviewing officer moves a few yards toward the major and halts; the major turns about, commands: 1. ***Present;*** 2. ***SABER,*** and again turns about and salutes.

The reviewing officer returns the salute; the major turns about, brings the battalion to carry saber and again turns to the front.

The reviewing officer approaches to within about 6 yards of the major; the latter salutes, returns saber, joins the reviewing officer, takes post on his right, and accompanies him around the battalion. The reviewing officer proceeds to the right of the band, passes along the front of the officers to the left of the line, and returns to the right, passing in rear of the line. The reviewing officer and those accompanying him salute the standard when passing in front of it.

While the reviewing officer is riding around the battalion the band plays, ceasing when he leaves the right to return to his post.

On arriving again at the right of the line the major salutes, halts, and, when the reviewing officer and staff have passed, moves directly to his post in front of the battalion, faces it, draws saber, and commands: 1. *Attention;* 2. *POSTS*. The chiefs of platoon and standard bearers execute a left about and take their posts in line. The major commands: 1. *By the right flank;* 2. *MARCH;* 3. *Battalion;* 4. *HALT*. The command *Halt* is given as soon as the carriages have completed the wheel. The band takes post 36 yards in front of the leading battery.

The column being formed, the major commands: 1. *Pass in review;* 2. *Forward;* 3. *MARCH;* 4. *Guide right*. At the command *March* the column marches off, the band playing. Without command from the major, the column changes direction at the points indicated, and column of batteries at full distances with guide to the right is formed successively to the left at the second change of direction. The major takes his post 24 yards in front of the band, immediately after the second change. The band, having passed the reviewing officer, turns to the left out of the column, takes post in front of and facing the reviewing officer and remains there until the review terminates.

When the major is 6 yards from the reviewing officer he and his staff salute, turning the head and eyes sharply to the right. When the major has passed 6 yards beyond the reviewing officer they resume the carry, turning the head and eyes to the front.

The other officers, noncommissioned staff officers and the drum major, salute at the point prescribed for the major, turning the head and eyes as above described. Noncommissioned officers commanding platoons salute with the hand.

The reviewing officer returns the salutes of the major and of the standard only.

The major, having saluted, takes post on the right of the reviewing officer, remains there until the rear of the battalion has passed, then salutes and rejoins his battalion. The band ceases to play when the column has completed its second change of direction after passing the reviewing officer.

When the battalion arrives at its original position in column the major commands: 1. *Trot* (or *Gallop*); 2. *MARCH*.

The battalion passes in review as before, except that the cannoneers' arms are not folded and that no salutes are rendered, except by the major when he leaves the reviewing officer.

The review terminates when the rear battery has passed the reviewing officer; the band then ceases to play and rejoins the battalion or is dismissed. The major and his staff rejoin the battalion.

The reviewing officer may prescribe how often the column shall pass in review and the gait or gaits to be used.

Review of a Battalion with Closed Intervals.

1005. The battalion is formed in line, each battery being at closed intervals. The review is conducted according to the principles previously explained, except that instead of first forming flank column the battalion is formed in column of batteries with closed intervals but full distances and passes in review in that formation.

SECTION III.—*Regimental review.*

1006. The regiment may be formed in line with full or closed intervals, in line of masses or in such other formation as the nature of the ground and the presence of other troops may necessitate.

When the formation is in line with full intervals, the colonel takes post facing to the front; the reviewing officer takes his post; the colonel turns about and commands: 1. ***Prepare for review;*** 2. ***MARCH***. The battalions are prepared for review as prescribed under Battalion Review. The review then proceeds as prescribed for the battalion review, substituting "colonel" for "major" and "regiment" for "battalion."

In riding around the regiment, the reviewing officer passes to the left in rear of the line of majors, then returns in rear of the line of carriages to the right.

At the second change of direction each major takes post 24 yards in front of his leading battery. When at closed intervals, this distance is suitably reduced.

1007. When the regiment is formed in line with closed intervals, the rules for the review of a battalion in line with closed intervals apply.

1008. When in line of masses or other formation, the review is conducted according to the same principles, each battery being placed in march in time to follow the preceding one at the proper distance.

SECTION IV.—*Brigade review.*

1009. The brigade is formed and prepared for review as explained for the regiment. The brigade commander and staff take post about 30 yards in front of the line of colonels, when in line; about 30 yards in front of the leading colonel, when in column.

The review is conducted according to the principles laid down for regimental review, the brigade commander taking post 24 yards in front of the leading colonel when at about 100 yards from the reviewing officer.

SECTION V.—*Garrison review.*

1010. A review of a body of troops less than a division, composed of different arms, is conducted on the principles laid down for a regiment.

The senior officer present commands the review; the senior officer present with each arm commands that arm. The troops of each arm form on the line according to the principles prescribed in the Drill Regulations for that arm.

Each commander gives the commands necessary to carry out the orders of the officer commanding the review.

Mounted troops will not be put in march to pass in review until the rear element of the foot troops has completed the second change of direction. The commanding officer, having saluted, turns out and joins the reviewing officer. The other commanders do not turn out of the column.

CHAPTER III.—INSPECTIONS.

SECTION I.—*General rules.*

1011. The inspector prescribes the kind of inspection which he desires.

1012. If there be both inspection and review, the inspection may either precede or follow the review.

When an inspection follows a review with the other arms the field artillery proceeds, at the proper time, to the place designated by the inspector and is inspected separately.

SECTION II.—*Battery inspection, mounted.*

1013. The battery being in double section line, the captain commands: 1. ***Prepare for inspection;*** 2. ***ACTION FRONT.***

At this command the gun sections are unlimbered (par. 223) and prepared for firing (par. 220), the breech blocks being left open until inspected. The chiefs of the third and fourth platoons move their platoons to the rear by a left about and, after gaining sufficient distance to the rear, execute a second left about and form their platoons in double section line abreast of the limbers of the gun sections.

The chiefs of the first and second platoons take post opposite the center and 4 yards in front of the line of muzzles of their platoons. The chiefs of the third and fourth platoons take post opposite the center and 4 yards in front of the lead drivers of their platoons.

The limbers and caissons being in position, the captain commands: 1. ***Right;*** 2. ***DRESS,*** verifies the alignment of the officers and the two ranks of carriages, commands ***Front,*** and posts himself, when not acting as inspector, opposite the center of the battery and 8 yards in front of the line of muzzles.

If the battery, store, and field wagons are present, they are formed on the left of the line under the command of the quartermaster sergeant. While thus assigned, the quartermaster sergeant posts himself as prescribed for the platoon commander. The stable sergeant takes post as prescribed in paragraph 665. The guidon is 4 yards from the right flank of the line of limbers, abreast of the lead drivers; the musicians on the right of the guidon, all boot to boot.

The chief mechanic, horseshoer, mechanics, and cooks are assigned as cannoneers of the gun and caisson sections when the battery, store, and field wagons are not present. When the wagons are present the chief mechanic, horseshoer, and mechanics are posted with the battery and store wagons, the cooks with the field wagons.

Chiefs of platoon cause all limbers and caissons to be opened for inspection; the quartermaster sergeant causes the forge and store wagons to be similarly opened.

When acting as inspector the captain inspects the chiefs of platoon from right to left; then the quartermaster sergeant and stable sergeant; passes by the rear of the battery to the post of the first sergeant and inspects him; thence by the rear of the battery to the right flank, where he returns saber and inspects the musicians and guidon.

He goes to the right section of the right platoon and inspects the section, commencing with the chief of section, passing in order to the caisson, the gun, and the limbers. He then similarly inspects the other sections in order from right to left.

When the captain commences the inspection of the right platoon the chiefs of the other platoons cause their platoons to stand *at ease,* calling them to *attention* as the captain approaches their platoons. Each chief of platoon accompanies the captain during the inspection of his platoon. As soon as a platoon is inspected its commander causes it to take the *march order* and then to stand *at ease.* The platoon commander faces his platoon while *at ease.*

The inspection being completed, the captain limbers front and rear and commands: 1. *Form double section line;* 2. *MARCH.*

At the second command each piece inclines to the right, executes a left about, and places itself in double section on the right of its caisson; the chiefs of the third and fourth platoons and the quartermaster sergeant move their platoons in double section up on the line established by the caissons of the gun sections.

1014. The battery carries for inspection every article that is prescribed as part of its regular equipment and for which there is a specially designated place assigned on the gun carriage. limber, or caisson.

The battery will be inspected frequently in full marching order.

1015. Should the inspector be other than the captain, the latter, having prepared his battery for inspection and taken his post, salutes when the inspector arrives in front of him. The inspector returns the salute, inspects the captain, and then inspects the battery in the order just prescribed. As soon as inspected the captain returns saber and accompanies the inspector.

Battery Inspection, Dismounted.

1016. The battery being in line, the officers at carry saber, the captain causes the ranks to be opened and commands: 1. *Inspection;* 2. *PISTOL.* Each man as the inspector approaches him executes *inspection pistol.*

1017. The captain returns saber, inspects the chiefs of platoon, the front rank, the rear rank, and the file closers, beginning on the right of each and returning by the left and rear. During the inspection of the ranks the lieutenants face about and stand at ease; they may be directed to accompany the captain or to assist in the inspection. Upon the completion of the inspection the lieutenants face to the front and resume the attention; the captain closes the ranks and dismisses the battery.

1018. Should the inspector be other than the captain the latter opens ranks and, when the inspector approaches, brings the battery to attention, faces to the front and salutes. The salute acknowledged, the captain carries saber, faces about, commands: 1. ***Inspection;*** 2. ***PISTOL,*** and again faces to the front.

The inspection proceeds as before; the captain returns saber and accompanies the inspector as soon as the latter has inspected him.

At inspection of quarters the inspector is accompanied by the captain and followed by the other officers, or by such of them as he may designate; the men, without accouterments, stand uncovered near their respective bunks; in camp they stand covered, without accouterments, in front of their tents; upon the approach of the inspector the first sergeant commands: ***ATTENTION,*** salutes and leads the way through the quarters or camp.

SECTION III.—*Battalion inspection.*

1019. The battalion being in column of batteries, in double section, on the approach of the inspector the major commands: 1. ***Prepare for inspection;*** 2. ***MARCH.***

The batteries are prepared for inspection as already prescribed.

The musicians join their batteries. The drum major conducts the band, if there be one, to the rear of the column, passing by the right flank, and places it facing to the front 36 yards in rear of the rear battery and open ranks.

The battalion staff officers place themselves in line with 1 yard intervals, about 40 yards in front of the column, opposite the center, in order of rank from right to left; the noncommissioned staff and the noncommissioned officers of the headquarters detachment form at 1 yard intervals 3 yards in rear of the staff officers; the privates are similarly posted 3 yards in rear of the noncommissioned officers. The reel cart takes post as prescribed in paragraph 755, the chests being opened at the command ***Prepare for inspection, March.*** The guard of the standard marches to the front and takes post 6 yards in rear of the center of the line of privates. The major takes post in front of the center of the column 6 yards in front of the staff.

The inspector inspects the major and, accompanied by the latter, inspects the staff officers.

The major and his staff, as soon as inspected, return saber and accompany the inspector. The noncommissioned staff officers do not return saber until inspected.

The inspector, commencing at the head of the column, inspects the noncommissioned staff, the guard of the standard, the batteries in their order in column, and the band. The noncommissioned staff and the guard of the standard may be dismissed as soon as inspected.

The captain of each battery not undergoing inspection dismounts his drivers and brings the men to rest. As the inspector approaches the battery the captain brings it to attention and mounts the drivers; as soon as he himself has been inspected he returns saber, and accompanies the inspector. The inspector proceeds as in battery inspection. At its completion the captain limbers the carriages, forms double section line to the front, dismounts his drivers, and brings the battery to rest. Upon intimation from the inspector the major may direct that each battery in turn be dismissed as soon as inspected.

The band plays during the inspection of the batteries.

When the inspector approaches the band the adjutant commands: 1. *Inspection;* 2. ***INSTRUMENTS,*** and the band is inspected as prescribed in paragraph 1071.

1020. The battalion may be inspected in line. The inspection is conducted according to the same principles as when formed in column. The major, his staff, noncommissioned staff, headquarters detachment, and reel cart are inspected at their posts in front of the center of the line; the band, which remains at its post on the right, is next inspected; then the batteries and the guard of the standard in their order from right to left.

1021. If the major is himself the inspector the inspection is conducted according to the same principles.

SECTION IV.—*Regimental inspection.*

1022. The commands and means are the same as prescribed for a battalion.

In column the staff of the colonel forms in line at intervals of 1 yard about 30 yards in front of the major of the first battalion, the adjutant on the right, the other staff officers in order of rank from right to left. The lieutenant colonel is on the right of the staff. The noncommissioned staff, headquarters detachment, guard of the standard, and reel cart form in a similar manner to that prescribed for battalion inspection. The colonel takes post 12 yards in front of the center of his staff.

The inspector inspects the colonel, and, accompanied by the latter, inspects the lieutenant colonel and staff officers.

The colonel, lieutenant colonel and staff, as soon as inspected, return saber and accompany the inspector.

Commencing at the head of the column, the inspector inspects the noncommissioned staff, headquarters detachment, guard of the standard, each battalion in succession, and the band.

The major of a battalion not undergoing inspection dismounts his drivers and brings the battalion to rest. On the approach of the inspector the major brings his battalion to attention, mounts the drivers, and accompanies the inspector through his battalion. The inspection is conducted as in battalion inspection, each captain dismounting his drivers and resting his battery while not undergoing inspection.

When the inspection of a battalion is completed the colonel, upon intimation from the inspector, may direct that the battalion be marched off and dismissed.

The adjutant gives the necessary commands for the inspection of the regimental noncommissioned staff, guard of the standard, and band.

Each battalion adjutant gives the necessary commands for the inspection of the battalion noncommissioned staff.

1023. The regiment may be inspected in line. The inspection is conducted according to the same principles as when formed in column. The colonel, his staff, noncommissioned staff, and headquarters detachment are inspected at their posts in front of the center of the line; the band, which remains at its post on the right, is next inspected; then the batteries and the guard of the standard in their order from right to left.

CHAPTER IV.—MUSTER.

Regimental, Battalion, or Battery Muster.

1024. Muster is held in line or in column of batteries, carriages limbered, drivers and cannoneers mounted.

The adjutant is provided with the muster roll of the field, staff, headquarters detachment, and band; each captain, with the roll of his battery. A list of absentees alphabetically arranged, showing cause and place of absence, accompanies each roll.

As the mustering officer approaches a battery, its captain commands: ***ATTENTION TO MUSTER.*** The mustering officer or the captain then calls the names on the roll, and as each man's name is called, he answers ***Here*** and dismounts. After muster the mustering officer verifies the presence of the men reported in hospital, on guard, etc.

If a battery be mustered dismounted the ranks are opened, and as each man's name is called he answers ***Here*** and steps 1 yard to the front.

CHAPTER V.—ESCORTS.

SECTION I.—*Escort of the standard.*

1025. The regiment being in line, the colonel details a battery to receive and escort the national standard to its place in line. During the ceremony the regimental standard remains with the guard of the standard at its post with the regiment.

The escort is formed in flank column, the band in front, the national standard bearer at the center of the column. The escort then marches without music to the colonel's office or quarters, is formed in line facing the entrance and halted, the band on the right, the standard bearer midway between the two center sections on a line with the muzzles.

The senior lieutenant, the standard bearer, and a sergeant designated by the commander of the escort dismount in front of the colonel's quarters, their horses being held by a musician. The standard bearer, preceded by the first lieutenant and followed by the sergeant, then goes to receive the standard.

The standard bearer comes out, followed by the lieutenant and sergeant. They mount and form facing the center of the escort, the lieutenant on the right, the sergeant on the left, the musician returning to his post. The captain then commands: 1. ***Present;*** 2. ***SABER;*** the officers of the escort present saber, the musicians with the band sounding ***to the standard,*** and the guidon saluting.

The sabers are brought to the carry; the lieutenant and sergeant return to their posts; the battery moves by the right flank, the band conforming to the movement, the standard bearer placing himself at the center of the column.

The escort marches with the guide left back to the regiment, the band playing. The march is so conducted that when the escort arrives at 90 yards in front of the right of the regiment the direction of the march shall be parallel to its front. When the standard arrives opposite its place in line the escort is formed in line to the left and halted. The standard bearer, passing between the carriages, advances and halts 12 yards in front of the colonel.

The standard bearer having halted, the colonel, who has posted himself 40 yards in front of the center of his regiment, faces the line and commands: 1. ***Present;*** 2. ***SABER.*** At this command officers and noncommissioned staff officers present saber. The regimental standard and the guidons execute the prescribed salute. The colonel faces to the front and salutes, the musicians sounding ***to the standard.*** As soon as the colonel has saluted, the national standard bearer executes the prescribed salute.

The colonel then faces about and commands: 1. ***Carry;*** 2. ***SABER.*** At the second command the carry is resumed. The standard bearer moves at a walk toward the regiment, and passing by the left of the guard of the standard executes a left about and takes his place in the guard.

The escort presents and carries saber with the regiment, at the command of the colonel. As soon as the standard has reached its place in line the captain forms the escort in column and marches it, preceded by the band, to its place in line, passing around the left flank of the regiment.

The band plays until the escort passes the left of the line, when it ceases playing and returns to its place on the right, passing in rear of the regiment.

The regiment may be brought to ***rest*** after the escort has passed the left of the line.

1026. If but one battalion of the regiment is present, escort of the standard is executed according to the same principles.

1027. If it is impracticable for the battery detailed as escort to approach the colonel's quarters or office and to form opposite it as above described, then the battery is marched to the most suitable place near by and there formed. The standard is then brought out as before, and is similarly saluted and received by the escort.

SECTION II.—*Funeral escort.*

1028. The composition and strength of the escort are prescribed in Army Regulations.

The escort is formed with its center opposite the quarters of the deceased, the cannoneers mounted, the band (or musicians) on that flank of the escort toward which it is to march.

Upon the appearance of the coffin the commander of the escort commands: 1. *Present;* 2. ***SABER,*** and the band plays an appropriate air; sabers are then brought to the carry.

The escort is then formed in flank or section column.

The procession is formed in the following order: 1, music; 2, escort; 3, clergy; 4, coffin and pallbearers; 5, mourners; 6, members of the former command of the deceased; 7, other officers and enlisted men; 8, distinguished persons; 9, delegations; 10, societies; 11, civilians.

Officers and enlisted men (Nos. 6 and 7), with side arms, are in the order of rank, seniors in front.

The escort marches at a walk to solemn music, and on arriving at the grave is formed in battery, with the center opposite the grave; the coffin is then carried along the front of the escort to the grave, sabers are presented, and the band plays an appropriate air; the coffin having been placed over the grave, the music ceases and sabers are brought to the carry.

The commander next commands: 1. *Parade;* 2. ***REST.***

At the second command the cannoneers execute *parade rest* and incline the head.

After the coffin is lowered into the grave and the funeral services are completed the commander of the escort commands: 1. *Battery* (or ———); 2. ***ATTENTION,*** and then fires three volleys of one round each with blank cartridges. In this case the command will be: 1. *Fire by battery (platoon, etc.);* 2. *Battery (platoon, etc.);* 3. ***FIRE.*** After the last volley a musician sounds taps over the grave.

The escort is then formed into column, marched to the point where it was assembled, and dismissed.

The band does not play until it has left the inclosure.

The funeral ceremony for an enlisted man is the same as for an officer, except that the commands *Present saber* and *Carry saber* are omitted; the sergeant in command of the escort salutes with the hand on the appearance of the coffin at the quarters of the deceased and also when the coffin is carried along the front of the escort to the grave.

1029. When the distance to the place of interment is considerable, the escort after leaving the camp or garrison may march at ease until it approaches the burial ground, when it is brought to attention. The music does not play while marching at ease.

In marching at attention the field music may alternate with the band in playing.

1030. When it is impracticable for the carriages to approach the grave, they are left outside the inclosure. If the escort consists of artillery only, the officers and mounted men, except drivers and horse holders of horse artillery, dismount, turn over their horses to the drivers or horse holders of horse artillery.

The officers and noncommissioned staff officers draw saber; the gun squads are next formed in column of squads; the coffin is then escorted to the grave, where line is formed and the same ceremonies are performed as before prescribed. The ceremony at the grave having been completed, the gun squads are marched to the guns and three volleys are fired; after the last volley a musician sounds taps over the grave.

1031. Should the entrance to the cemetery prevent the hearse accompanying the escort till the latter halts at the grave, the column is halted at the entrance long enough to take the coffin from the hearse, when the column is again put in march. The cavalry and artillery of the escort, when unable to enter the inclosure, turn out of the column and salute the coffin as it passes.

1032. In all funeral ceremonies six pallbearers will be selected as far as practicable from the grade of the deceased. If the deceased is a commissioned officer, the coffin is borne by six noncommissioned officers; if a noncommissioned officer or private, by six privates.

1033. When arms are presented at the funeral of a general officer, the field music sounds the *march* or *flourishes*, according to the rank of the deceased, after which the band plays an appropriate air.

After the remains are deposited in the grave a salute corresponding to the rank of the deceased will be fired, in addition to three volleys of artillery or of musketry.

1034. At the funeral of a mounted officer or enlisted man, his horse, in mourning caparison, follows the hearse.

1035. When necessary to escort the remains from the quarters of the deceased to the church before the funeral service, arms are presented upon receiving the remains at the quarters and also as they are borne into the church.

1036. Before the funeral the commander of the escort gives the clergyman and pallbearers all needed directions.

CHAPTER VI.—PRESENTATION TO THE STANDARD.

1037. At least once a year the recruits of the regiment will be formally presented to their standard.

For this purpose the regiment will be formed in line of masses dismounted, the recruits who have joined since the last presentation being posted on the left of their respective batteries. At an intimation from the adjutant, and under his supervision, the recruits of each battery are marched to the front and center by noncommissioned officers designated for the purpose, and formed in line midway between the colonel and the regiment. The noncommissioned officers, after halting and aligning their squads, take post in the line of file closers.

The national and regimental standards are brought by the guard of the standard from the colonel's quarters or office and posted 12 yards in front of the colonel facing him, when honors are rendered as in the ceremony of ***escort of the standard.***

On the conclusion of the salute the colonel faces about and addresses the recruits in remarks appropriate to the occasion. He then commands: 1. ***Carry;*** 2. ***SABER;*** 3. ***DISMISS YOUR BATTERIES.*** The standard is escorted by the guard of the standard to the colonel's office or quarters; the squads are marched to the batteries, and the batteries are marched off by their captains and dismissed.

CHAPTER VII.—GUARD MOUNTING.

1038. At the assembly the battery, or such subdivisions of the battery as have been designated for guard duty, fall in on the battery parade as prescribed in The Battery Dismounted.

The first sergeant verifies the detail, inspects the dress and general appearance of the men, and replaces any man unfit to march on guard. He then forms the detail into one or two sections, in accordance with instructions previously given by the adjutant, and assigns the noncommissioned officers to posts as prescribed for chiefs of section, gunners, caisson corporals, and file closers. If there is no officer of the guard, the senior noncommissioned officer is not assigned to a post as chief of section, but takes post temporarily in the line of file closers.

Upon completion of the inspection the first sergeant retires and the senior noncommissioned officer marches the detail to the vicinity of the parade ground and halts it.

The band takes post on the parade ground so that the left of its front rank shall be 12 yards to the right of the front rank of the guard when the latter is formed.

1039. At adjutant's call the adjutant and the sergeant major, dismounted, the latter on the left, march to the parade ground, the band playing in quick or double time. The adjutant halts and takes post so as to be 12 yards in front of and facing the center of the guard when formed; the sergeant major continues on, moves by the left flank, and takes post facing to the left, 12 yards to the left of the front rank of the band.

The detail is then marched to the line so that the breast of the guide on the right shall, upon halting, be near to and opposite the left arm of the sergeant major. The senior noncommissioned officer halts the detail, places himself in front of and facing the sergeant major at a distance equal to or a little greater than the front of the detail, and commands: 1. ***Right;*** 2. ***DRESS.***

The detail dresses up to the line of the sergeant major and the noncommissioned officer commanding the detail, the guide on the right placing his breast against the left arm of the sergeant major; the detail being aligned, the senior noncommissioned officer commands: ***FRONT,*** salutes with the right hand, and reports: ***The detail is correct;*** or, ***(So many) sergeants, corporals, or privates are absent.***

The sergeant major returns the salute with the right hand after the report is made; the senior noncommissioned officer then takes his post as chief of section, or as commander of the guard.

1040. When the detail has been formed the sergeant major takes a side step to the right, draws saber, verifies the detail, takes post 2 yards to the right and 2 yards to the front of the detail, facing to the left, and commands: 1. ***Open ranks;*** 2. ***MARCH;*** 3. ***FRONT,*** which is executed according to the principles of ***To open ranks*** in The Battery Dismounted, the sergeant major when giving the commands being at the post described above. The sergeant major then moves parallel to the front rank until opposite its center, turns to the right, halts midway to the adjutant, salutes, and reports: ***Sir, the detail is correct;*** or, ***Sir, so many sergeants, corporals, or privates are absent.*** The adjutant returns the salute, directs the sergeant major: ***Take your post,*** and then draws saber. The sergeant major faces about, approaches to within 4 yards of the center of the front rank, turns to the right, moves 3 yards beyond the left flank of the detail, turns to the left, halts on the line of the front rank, and faces about.

When the sergeant major has reported, the officer of the guard takes post facing to the front, 4 yards in front of the center of the guard, and draws saber.

The adjutant then directs: ***Inspect your guard, sir;*** at which the officer of the guard faces about and commands: 1. ***Inspection;*** 2. ***PISTOLS;*** returns saber, and inspects the guard. He also, when so directed, selects an orderly for the commanding officer.

During the inspection the band plays; the adjutant returns saber and observes the general condition of the guard.

1041. If there be a junior officer of the guard, he takes post and draws saber at the same time as the senior, placing himself opposite the center of the guard and 2 yards in rear of the line of file closers, facing to the front. He may be directed by the commander of the guard to assist in inspecting the guard.

If there be no officer of the guard the adjutant inspects the guard.

A noncommissioned officer commanding the guard takes post in the front rank, 1 yard from the right of the first section, when the guard is in line; and takes the post of the officer of the guard when in column or passing in review.

1042. The inspection ended, the adjutant places himself about 30 yards in front of and facing the center of the guard, and draws saber; the new officer of the day takes post in front of and facing the guard, 30 yards from the adjutant; the old officer of the day takes post 3 yards to the right and 1 yard in rear of the new officer of the day; the officer of the guard resumes his post and draws saber with the adjutant; thereafter he takes the same relative position as a chief of platoon in The Battery Dismounted.

The adjutant then commands: 1. ***Parade;*** 2. ***REST;*** 3. ***SOUND OFF,*** and comes to parade rest.

The band, playing, passes in front of the officer of the guard to the left of the line, and back to its post on the right, when it ceases playing.

The adjutant then comes to attention, and commands: 1. ***Guard;*** 2. ***ATTENTION;*** 3. ***Close ranks;*** 4. ***MARCH.***

The ranks are closed as in The Battery Dismounted.

The adjutant then commands: 1. ***Present;*** 2. ***SABER;*** faces about, salutes, and reports: ***Sir, the guard is formed.*** The officer of the day, after the adjutant has reported, returns the salute with the hand and directs the adjutant: ***March the guard in review, sir.***

The adjutant carries saber, faces about, and commands: 1. ***Carry;*** 2. ***SABER,*** and then commands: 1. ***Sections right;*** 2. ***MARCH;*** 3. ***Guard;*** 4. ***HALT.***

The sections execute the movement; the band turns to the right and places itself 12 yards in front of the first section. The adjutant takes post abreast of and 6 yards from the left of the front rank of the leading section, the sergeant major covering him and abreast of the front rank of the rear section.

The adjutant then commands: 1. ***Pass in review;*** 2. ***Forward;*** 3. ***MARCH;*** 4. ***Guide right;*** at the third command the guard moves off, the band playing; without command from the adjutant, the guard changes direction at the proper points and marches at quick time past the officer of the day. When the leading section is about 6 yards from the officer of the day, the commander of the guard commands: 1. ***Eyes;*** 2. ***RIGHT;*** and commands: ***FRONT,*** when 6 yards beyond him; at the command ***right*** the adjutant, the commander of the guard, and the sergeant major salute, and all turn the head and eyes to the right; at the command ***front*** all turn the head and eyes to the front, and the officers and sergeant major resume the carry saber. The drum major, without command, salutes when passing the officer of the day.

The band, having passed the officer of the day, turns to the left out of column, places itself opposite and facing him, and continues to play until the guard leaves the parade ground. The field music detaches itself from the band when the latter turns out of the column, and, remaining in front of the guard, commences to play when the band ceases. In the absence of the band, the field music does not turn out of the column but continues in front of the guard.

Having passed 12 yards beyond the officer of the day the adjutant halts; the sregeant major halts abreast of him and 1 yard to his left; they then return saber, salute, and retire. The commander of the guard then commands: 1. *By the right flank;* 2. *Sections column left;* 3. ***MARCH,*** and marches the guard to its post.

The officers of the day face toward each other and salute; the old officer of the day turns over the orders to the new officer of the day. While the band is sounding off and while the guard is marching in review, the officers of the day stand at parade rest with the arms folded, elbows nearly the height of the shoulders. They take this position when the adjutant comes to parade rest, resume the attention with him, again take the parade rest at the first note of the march in review, and resume the attention as the head of the column approaches.

The new officer of the day returns the salute of the commander of the guard and the adjutant, making one salute with the hand.

1043. As the new guard approaches the guardhouse, the old guard is formed in line, with its field music 3 yards to the right; and, when the field music at the head of the new guard arrives opposite the left of the old guard, the commander of the new guard commands: 1. *Eyes;* 2. ***RIGHT;*** the commanders of both guards salute. The new guard marches in quick time past the old guard; when the commander of the new guard is opposite the field music of the old guard, he commands: ***FRONT;*** the commanders of both guards resume carry saber. The field music having marched 3 yards beyond the field music of the old guard, changes direction to the right, and, followed by the guard, changes direction to the left, when on a line with the old guard; the changes of direction are without command. The commander of the guard halts on the line of the front rank of the old guard, allows his guard to march past him, and, when its rear approaches, halts it and faces it to the left, establishes the left guide 3 yards to the right of the field music of the old guard and on a line with the front rank, and then dresses his guard to the left; the field music of the new guard is 3 yards to the right of its front rank.

1044. The new guard being in line, the commander of each guard, at his post in front of the center, salutes and carries saber.

Should a guard be commanded by a noncommissioned officer, he stands on the right or left of the front rank, according as he commands the old or new guard, and salutes with the right hand.

1045. The detachments and sentinels of the old guard are relieved, and as they come in, take their proper places in the formation; the commander of the old guard then marches it, with the guide right, 6 yards to the front, then in flank column to the right; the field music begins to play and the guard marches in quick time past the new guard, the commanders of both guards saluting.

1046. Upon arriving at the battery parade, the commander of the old guard forms line and dismisses the guard.

1047. In bad weather, at night, after long marches, or when the guard is very small, the music may be dispensed with, or the field music may take the place of the band and sound off, standing on the right of the guard, and the review be omitted.

The new officer of the day directs the adjutant: ***March the guard to its post, sir.*** The adjutant commands: 1. ***Guard to its post,*** and adds the necessary commands for the guard to move off in flank column.

1048. If an entire battery be detailed for guard, it will be mounted according to the principles laid down in the foregoing, except that the battery retains its normal formation, and if marched in review, it will be formed in column of platoons for that purpose.

1049. If the guard is formed as a single section, the adjutant commands: 1. ***Guard right;*** 2. ***MARCH;*** 3. ***Guard;*** 4. ***HALT,*** and it passes in review as before prescribed; the commander of the guard is 2 yards in front of the chief of section; the adjutant places himself 6 yards from the left flank of the guard and abreast of the commander of the guard; the sergeant major covers the adjutant on a line with the front rank.

1050. When a battery stable and park guard is mounted, the ceremony is conducted according to the foregoing principles, the battery officer of the day performing the duties of the adjutant and the first sergeant those of the sergeant major. The guard is not marched in review.

1051. For detailed instructions not herein prescribed, see Manual of Guard Duty.

CHAPTER VIII.—MISCELLANEOUS.

SECTION I.—*The guidon.*

MANUAL OF THE GUIDON.

1052. ***The position of carry guidon, dismounted.***—The lance of the guidon is held vertically in the right hand, thumb in front of the lance, forefinger along the side, ferrule about 6 inches from the ground. It is thus carried in marching.

When leading the horse the lance is held in a corresponding position in the left hand.

1053. ***The position of order guidon.***—The ferrule of the lance rests on the ground on a line with and touching the toe of the right shoe; the right hand grasps the lance in the same manner as when at a carry.

1054. ***The position of parade rest.***—The ferrule of the lance is on the ground as at the order; the lance is held with both hands in front of the center of the body, left hand uppermost.

1055. ***To mount and dismount; the position of carry guidon, mounted.***—At stand to horse the ferrule of the lance rests on the ground on a line with and touching the toe of the left shoe, lance vertical and supported by the left hand; hand at the height of the neck, elbow and forearm closed against the lance.

Preparatory to mounting, grasp the reins and a lock of the mane in the left hand, lance held in the same hand, reins on the near side of the lance; place the right hand on the pommel and mount in the usual manner. After mounting, grasp the lance with the right hand under the left, which lets go of it without quitting the reins; carry the lance to the right side, lower and place the ferrule in the stirrup socket. The right hand then grasps the lance, forearm nearly horizontal, the arm through the sling, lance vertical; this is the position of ***carry guidon, mounted.***

Dismounting with the guidon is executed in a manner the reverse of the foregoing.

1056. ***Salutes.***—Being mounted: Lower the guidon to the front until the lance (under the right arm) is horizontal.

Being dismounted: Slip the right hand up the lance as high as the eye, then lower the lance to the front by straightening the right arm to its full extent.

If marching, the salute is executed when at 6 yards from the officer entitled to the salute; the carry is resumed after passing 6 yards beyond him.

At the halt the salute is executed at the command ***Present saber;*** the carry is resumed at the command ***Carry saber.***

SECTION II.—*The standard.*

1057. Whenever in these regulations the term ***the standard*** is used it includes the national and the regimental standards, and the service standard issued to battalions; if any one of these is referred to, the term ***the national standards, the regimental standard,*** or ***the service standard*** is used.

1058. The manual of the standard is as prescribed for the guidon except that at carry standard, dismounted, the ferrule of the lance is supported at the right hip.

The standard salutes in the ceremony ***escort of the standard*** and when saluting an officer entitled to the honor, but in no other case.

1059. ***The guard of the standard.***—The guard of the standard consists of the color sergeants and of two experienced men selected by the colonel. The guard is habitually formed in line, the color sergeants in the center.

The national standard is carried by the senior color sergeant, who is nearest to the right flank of the guard and who commands the guard. The regimental standard is carried by the other color sergeant. The latter conforms to the movements of the former, maintaining his position on the left.

Whenever a battalion is serving alone and the regimental color sergeant is not present, a battalion commander is authorized to select and detail a suitable noncommissioned officer from those actually present for duty with the battalion to carry the service standard.

The standard, kept at the quarters or office of the colonel, is escorted by the guard to the place of formation of the regiment and is similarly returned.

1060. ***Post of the standard.***—At the formation of the regiment, as soon as the battalions have taken their places, the guard of the standard takes post midway between the two battalions—in line, abreast of the lead drivers of the leading carriages; in column, at the center of the column. If the formation of the regiment is changed from line to column, or the reverse, the standard conforms to the movement, taking its new position by the most direct route.

When during exercises the regimental formation is broken up, the standard joins the colonel or is dismissed, as may be directed by the adjutant.

If the regiment is subdivided for action, the standard takes post as directed by the adjutant.

If only one battalion of the regiment is present, the standard takes post at the formation midway between the center and left (or rear) batteries of the battalion. If the order of the batteries in line or column is reversed. it maintains its relative position with respect to these two batteries. The standard conforms in other respects to what is above prescribed.

SECTION III.—*The saber.*

1061. Officers, regimental and battalion noncommissioned staff officers and the drum major are armed with the saber.

At ceremonies sabers are habitually drawn. In route marches they are habitually in the scabbard. At other times they are drawn or in the scabbard in the discretion of the officer in command; when he draws or returns saber, officers and noncommissioned staff officers under his command draw and return saber with him.

For dismounted duty the saber is attached to the belt, and is kept hooked up except when drawing and returning saber.

For mounted duty the saber is habitually attached to the left side of the saddle. It is not removed from the saddle when dismounting temporarily for the performance of some duty on foot.

1062. ***To draw the saber; the position of carry saber.***—Unhook the saber with the thumb and first two fingers of the left hand, thumb on the end of the hook, fingers lifting the upper ring; grasp the scabbard with the left hand at the upper band, bring the hilt a little forward, seize the grip with the right hand and draw the saber quickly, raising the arm to its full extent to the right front at an angle of about 45° with the horizontal, the saber, edge down, in a straight line with the arm; make a slight pause and bring the back of the blade against the shoulder, edge to the front, arm nearly extended. hand by the side, elbow back, third and fourth fingers back of the grip; at the same time hook up the scabbard with the thumb and first two fingers of the left hand, thumb through the upper ring, fingers supporting it; drop the left hand by the side. This is the position of carry saber dismounted.

To draw the saber when mounted, reach with the right hand over the bridle hand, and, without the aid of the bridle hand, draw the saber as before. The right hand at the carry rests on the right thigh.

1063. The saber if drawn is, while at attention, habitually held at the carry, except when dismounted and moving in double time; in the latter case it is carried diagonally across the breast, edge to the front, the left hand steadying the scabbard.

1064. Being at carry saber: 1. *Present;* 2. *SABER.*

For officers: At the command *Present* raise and carry the saber to the front, base of the hilt as high as the chin and 6 inches in front of the neck, edge to the left, point 6 inches farther to the front than the hilt, thumb extended on the left of the grip, all the fingers grasping the grip. At the command *Saber* lower the saber, point in prolongation of the right foot and near the ground, edge to the left, hand by the side, thumb on left of grip, arm extended. If mounted, the hand is lowered behind the thigh, point a little to the right and front of the stirrup.

For enlisted men: Execute at the command *Saber* what is above prescribed for officers at the command *Present,* and retain the saber in the raised position until the second command of *Carry saber.*

1065. Being at present saber: 1. *Carry;* 2. *SABER.*

At the command *Saber,* resume the position of carry saber.

1066. Being at carry saber: 1. *Parade;* 2. *REST.*

Take the position of parade rest (par. 49), point of saber on or near the ground in front of the center of the body, edge to the right.

At the command *Attention,* resume the carry saber and the position of the soldier.

1067. *To return saber.*—Carry the right hand opposite to and 6 inches from the left shoulder, saber vertical, edge to the left; at the same time unhook and lower the scabbard with the left hand and grasp it at the upper band; drop the point to the rear and pass the blade across and along the left arm; turn the head slightly to the left, fixing the eyes on the opening of the scabbard, raise the right hand, insert and return the blade; turn the head to the front, drop the right hand by the side, hook up the scabbard with the left hand, drop the left hand by the side.

When mounted the saber is returned without using the left hand.

1068. At inspection enlisted men, with the saber drawn, execute at the approach of the inspector the first motion of ***Present saber*** and turn the wrist to show the other side of the blade, resuming the carry when the inspector has passed.

SECTION IV.—*The band.*

1069. The band is generally formed in column of fours. It may be formed in two or more ranks.

Dismounted, the band is formed in two or more ranks, with sufficient intervals between the men and distances between the ranks to permit a free use of the instruments.

The drum major is 3 yards (dismounted, 2 yards) in front of the center of the front rank. He gives the commands or signals for its movements. The commands are the same as for a squad, substituting in them ***band*** for ***squad***.

In line the band is posted with the left of its front rank 36 yards to the right of the right battery. In column it marches with its rear rank 36 yards in front of the leading battery or its front rank 36 yards in rear of the rear battery, according as the column has been formed to the right or the left.

Dismounted, the band takes post as when mounted.

When united, the musicians form in rear of the band. When the band is not present, the posts, movements, and duties of the musicians are the same as prescribed for the band.

In rendering honors, whenever the standard salutes the musicians sound the ***march, flourishes,*** or ***to the standard,*** at a signal from the drum major.

In marching, the different ranks dress to the right.

When the command with which the band is posted faces to the rear, the band executes the countermarch. The intervals are increased before executing a countermarch and closed upon the completion of the countermarch.

In executing the countermarch, the men in the leading rank to the right of the drum major turn individually to the right about and those to his left to the left about, each followed by the men covering him in the column. The drum major passes through the center.

In dismounted formations, when right, left, or about face is executed, the band faces in the same manner.

Signals of the Drum Major.

1070. The signals for the movements of the band will correspond to the saber signals (par. 687) as far as practicable.

Prepare to play: Take the first position of present saber.

Play: Thrust upward energetically with the saber, arm fully extended, and quickly resume the carry.

Prepare to cease playing: Same as prepare to play.

Cease playing: Same as play.

The march or flourishes.—1. *Prepare to play:* Raise the hand to the height of the forehead and hold the saber in a horizontal position, point to the left.

2. *Play:* Lower the hand quickly to the belt and resume the carry.

Increase intervals: Extend the arm to the front and wave the saber several times to the right and left in front of the body.

To Inspect the Band.

1071. Being at the halt: 1. *Open ranks;* 2. *MARCH;* 3. *FRONT.*

The front rank dresses to the right; the other ranks move backward, each taking the distance of 3 yards (dismounted, 2 yards) from the rank preceding, halt, and dress to the right.

1. *Inspection;* 2. *INSTRUMENTS.*

Each musician as the inspector approaches him raises his instrument in front of his body, reverses it so as to show the other side, and then returns it to its former position.

A musician, when inspected, executes with his bugle what is prescribed for a band musician.

1. *Close ranks;* 2. *MARCH.*

The front rank stands fast; the other ranks move up and close to the proper distance.

SECTION V.—*Honors.*

1072. The officers named below are received with standards and colors drooping, officers and troops saluting, and the bands and field music playing, as follows: The President, the President's march; the General, the General's march; the Lieutenant

General, bugles sounding three flourishes or drums beating three ruffles; a major general, two flourishes or two ruffles; a brigadier general, one flourish or one ruffle.

1073. To the Vice President, the members of the Cabinet, the Chief Justice, the President of the Senate, the Speaker of the House of Representatives, American or foreign ambassadors, and governors within their respective States and Territories, the same honors are paid as to the General; to the Assistant Secretary of War and to American or foreign envoys or ministers, the same honors as to the Lieutenant General; to officers of the Navy, the honors due to their relative rank; to officers of marines and volunteers, and militia when in the service of the United States, the honors due to like grades in the regular service; to officers of a foreign service, the honors due to their rank.

1074. The national or a regimental color or standard, uncased, passing a guard or other armed body is saluted, the field music sounding ***to the color*** or ***to the standard.*** Officers or enlisted men passing an uncased color or standard render the prescribed salute; with no arms in hand, the salute is made by uncovering, the headdress being held in the right hand opposite the left shoulder, right forearm against the breast.

1075. Whenever The Star Spangled Banner is played by the band on a formal occasion at a military station or at any place where persons belonging to the military service are present in their official capacity, all officers and enlisted men present will stand at attention, such position being retained until the last note of The Star Spangled Banner. The same respect will be observed toward the national air of any other country when it is played as a compliment to official representatives of such country. Whenever The Star Spangled Banner is played under circumstances contemplated by this paragraph the air will be played through once without repetition of any part except such repetition as is called for by the musical score.

1076. When the flag is lowered at retreat and aboard transport when the flag is hoisted at guard mounting, part of the ceremony is the playing of The Star Spangled Banner (or To the Color when there is no band), and another part is the salute to the flag. All officers and enlisted men out of ranks stand at attention facing the flag while the air is being played, and at the last note of the music salute in the prescribed manner.

1077. No honors are paid by troops when on the march or in trenches, except that they may be called to attention, and no salute is rendered by troops marching in double time or at the trot or gallop.

1078. When armed bodies of troops, or unarmed bodies commanded by commissioned officers, pass each other, except during drills or exercises, they are called to attention, if not already at attention, and the commanders salute, the junior rendering the first salute.

1079. Before saluting an armed body troops are always brought to attention.

1080. No salutes are rendered between unarmed bodies commanded by noncommissioned officers.

1081. If an officer passes a body of troops, except at drills or exercises, compliments are paid as follows:

If the officer is a superior officer of the commander of the troops, the troops are called to attention, if not already at attention, the commander salutes and the officer returns the salute. If the officer is not a superior officer of the commander of the troops, salutes are exchanged, the junior saluting first, and the troops are not called to attention.

1082. If an officer or body of troops entitled to salute passes in rear of troops at a halt, the troops are brought to attention but no salutes are rendered.

1083. The commander of a body of troops, if a commissioned officer, is saluted by all officers junior in rank and by all enlisted men. The salute is returned by the commander only, who does not call his command to attention if it be not at attention. The commander only is saluted.

1084. All officers salute on meeting and in making or receiving official reports. Military courtesy requires the junior to salute first, but when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior—as, for example, to the adjutant, officer of the day, etc.—the officer making the report, whatever his rank, will salute first; when not otherwise prescribed in ceremonies, the officer to whom the report is made will acknowledge, by saluting, that he has received and understood the report. When under arms the salute is made with the saber if drawn;

otherwise with the hand. A mounted officer dismounts before addressing a superior not mounted.

1085. On official occasions officers, when indoors and under arms, do not uncover, but salute with the saber if drawn; otherwise with the hand. If not under arms, they uncover and stand at attention, but do not salute except when making or receiving reports.

1086. An enlisted man not in ranks, whether in uniform or not, salutes all officers when within saluting distance; the salute is made when dismounted with the hand farthest from the officer; when mounted, with the right hand.

Officers are saluted whether in uniform or not.

1087. A noncommissioned officer or private in command of a detachment salutes with the hand. A noncommissioned staff officer armed with the saber, when in command of a detachment or out of ranks, salutes with the saber if drawn; otherwise with the hand.

1088. An enlisted man, if seated, rises on the approach of an officer, faces toward him, and salutes. If standing, he faces the officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease work to salute an officer unless addressed by him; if addressed, they stand at attention and salute.

1089. An enlisted man, whether covered or uncovered, makes the prescribed salute before addressing an officer. When the interview is terminated he again salutes.

A mounted man dismounts before addressing an officer not mounted.

1090. All salutes in passing or approaching are begun first by the junior at 6 paces distance, or at 6 paces from the nearest point of passing; no salutes, except as otherwise prescribed, are made at greater distances than 30 paces.

1091. Indoors, an unarmed enlisted man uncovers and stands at attention upon the approach of an officer; he does not salute unless he addresses or is addressed by the officer. If armed, he salutes as heretofore prescribed without uncovering. Out of doors, if uncovered, he salutes.

1092. When an officer enters a room where there are soldiers the word ***Attention*** is given by some one who perceives him, when all rise and remain standing in the position of the soldier until the officer leaves the room or signifies his wishes. The same rule applies when an officer junior to the one entering is also in the room. Soldiers at meals do not rise.

1093. When an officer approaches a number of enlisted men out of doors and not in ranks the word *Attention* is given by some one who perceives him, when all stand at attention and all salute.

1094. Officers at all times acknowledge the courtesies of junior officers and enlisted men by returning their salutes in the manner prescribed in these regulations. When several officers are saluted, all who are entitled to the salute return it.

1095. Soldiers at all times and in all situations pay the same compliments to officers of the Army, Navy, Marine Corps, and volunteers and to officers of the organized militia in uniform as to officers of their own regiment, corps, or arm of service.

1096. Officers arriving at the headquarters of a military command, or at a military post, call upon the commander thereof as soon as practicable and register their names. If the visiting officer be senior to the commander, the former may send a card, in which case it becomes the duty of the commander to make the first call.

1097. Honors, courtesies, and ceremonies not referred to herein are found in Army Regulations and in the Manual of Guard Duty.

PART IX.

BUGLE CALLS.

Warning Calls.

1098. ***First call, guard mounting, full dress, overcoats, drill, stable, water,*** and ***boots and saddles*** precede the ***assembly*** by such interval as may be prescribed by the commanding officer.

Mess, church, and ***fatigue,*** classed as ***service calls,*** may also be used as warning calls.

First call is the first signal for formation for roll call on foot.

Guard mounting is the first signal for guard mounting.

Drill call is the first signal for drill dismounted.

Boots and saddles is the signal for mounted formations; for mounted drill, it immediately follows the signal ***drill.***

The musicians assemble at ***first call, guard mounting,*** and ***boots and saddles.***

When full dress or overcoats are to be worn, the ***full dress*** or ***overcoat call*** immediately follows ***first call, guard mounting,*** or ***boots and saddles.***

Formation Calls.

1099. ***Assembly.***—The signal for the batteries or details to form on their battery parade grounds.

When the drivers are near their horses, and the men are known to be present, the ***assembly*** may be omitted after ***boots and saddles,*** at the discretion of the commanding officer, in which case the drivers immediately proceed to their horses and harness without further command; the cannoneers proceed to their guns.

Adjutant's call.—The signal for the batteries or guard details to assemble on the camp or garrison parade ground; it follows the ***assembly*** at such interval as may be prescribed by the commanding officer.

To the standard.—The signal for the battalions to form regiment. It is also used when the standard salutes.

Alarm Calls.

1100. ***Fire call.***—The signal for the men to fall in, without arms, to extinguish fire.

To arms or ***to horse.***—The signal for the batteries to form at a designated place, harnessed and hitched, as quickly as possible.

Service Calls.

1101. ***Taps, mess, sick, church, recall, issue, officers', captains', first sergeants', fatigue, school,*** and ***the general.***

The general is the signal for striking tents and loading wagons preparatory to marching.

Reveille precedes the assembly for roll call; ***retreat*** follows the ***assembly,*** the interval between being only that required for formation and roll call.

Taps is the signal for extinguishing lights; it is usually preceded by ***call to quarters*** by such interval as is prescribed in Army Regulations.

Assembly, reveille, retreat, adjutant's call, to the standard, the ***flourishes,*** and the ***marches*** are sounded by all the musicians united; the other calls, as a rule, are sounded by the musician of the guard or orderly musician; he may also sound the ***assembly*** when the musicians are not united.

The morning gun is fired at the first note of reveille, or, if marches be played before reveille, it is fired at the commencement of the first march.

The evening gun is fired at the last note of retreat.

Drill Signals.

1102. The drill signals include both the preparatory commands and the commands of execution; the last note is the command of execution.

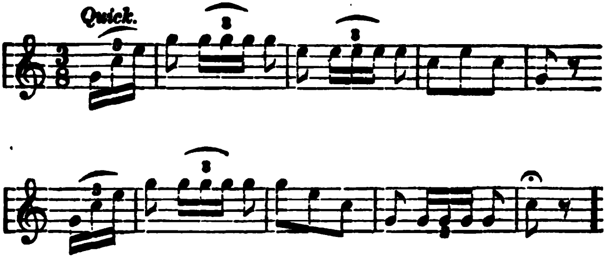
The drill signals are taught in succession, a few at a time, until all the officers and men are thoroughly familiar with them, some drills being specially devoted to this purpose.

The memorizing of these signals will be facilitated by observing that all movements to the right are on the ascending scale; that the corresponding movements to the left are corresponding signals on the descending scale; that the changes of gait are all upon the same note; that captains' call is the first two bars of ***officers' call*** with the ***attention*** added.

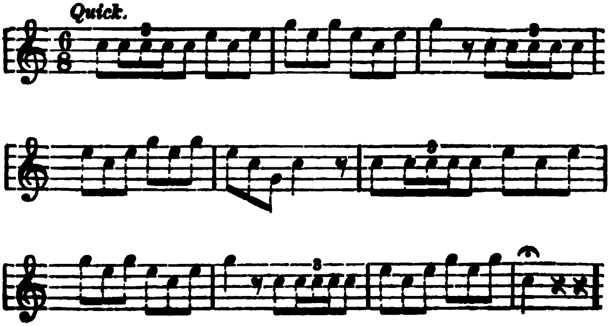
BUGLE CALLS.

To economize space, the music is written an octavo higher than the trumpet scale, and is adjusted to the scale of the bugle.

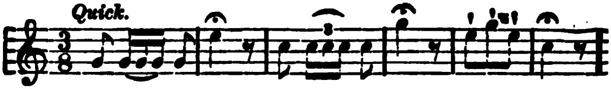
1. FIRST CALL.



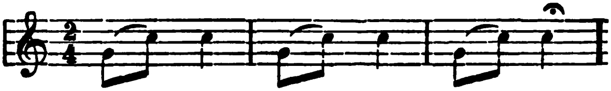
2. GUARD MOUNTING.



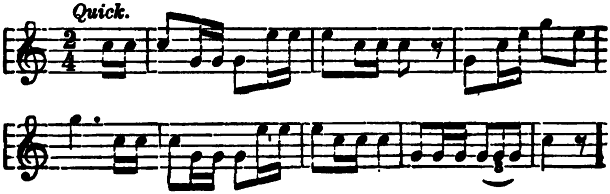
3. FULL DRESS.



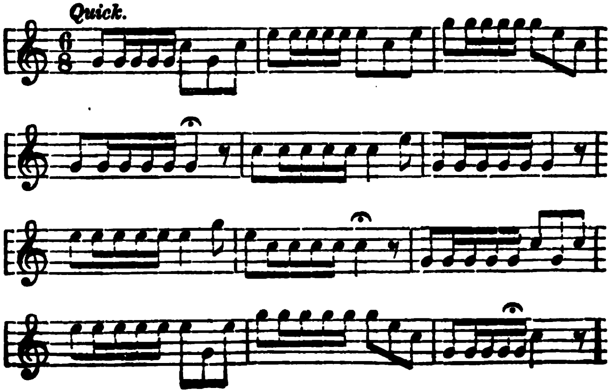
4. OVERCOATS.



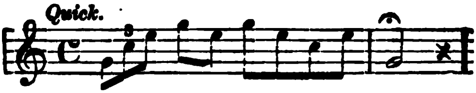
5. DRILL.



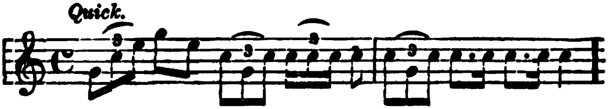
6. STABLE.



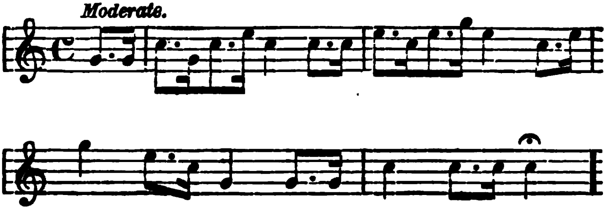
7. WATER.



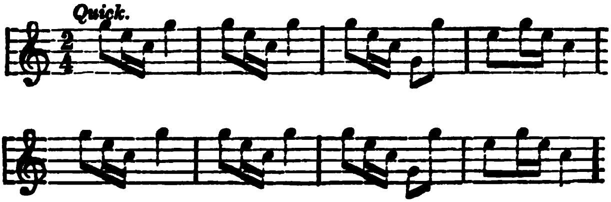
8. BOOTS AND SADDLES



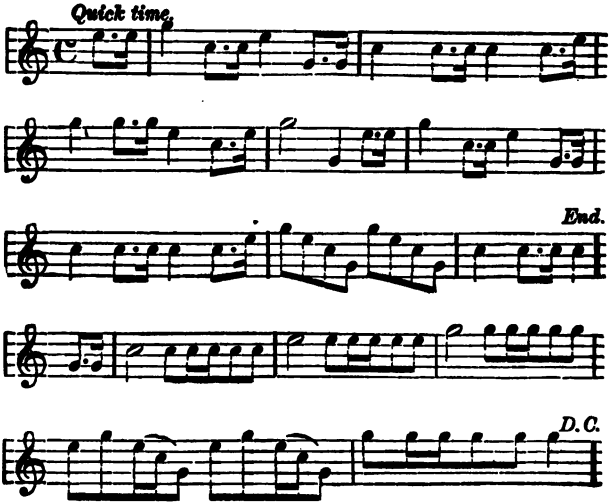
9. ASSEMBLY.



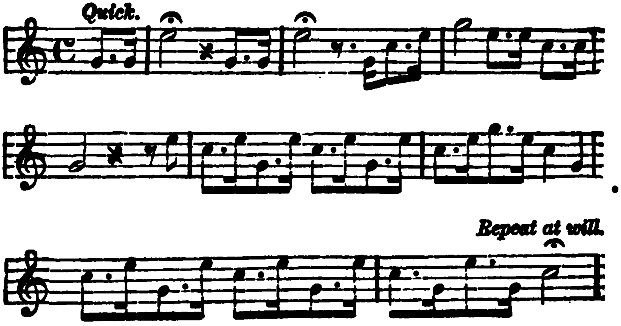
10. ADJUTANT'S CALL.



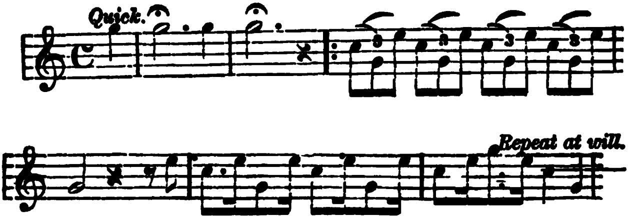
11. TO THE STANDARD.



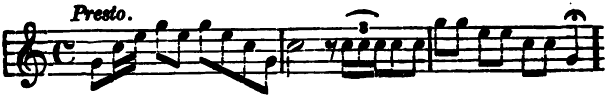
12. FIRE.



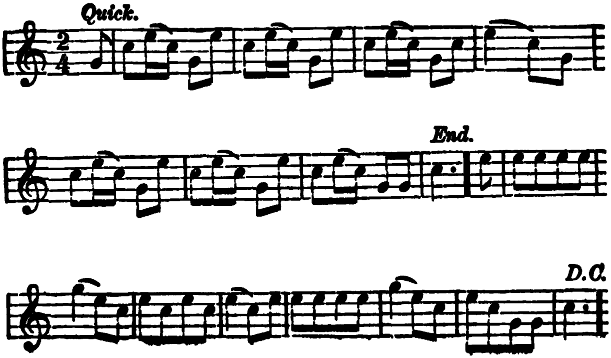
13. TO ARMS.



14. TO HORSE.

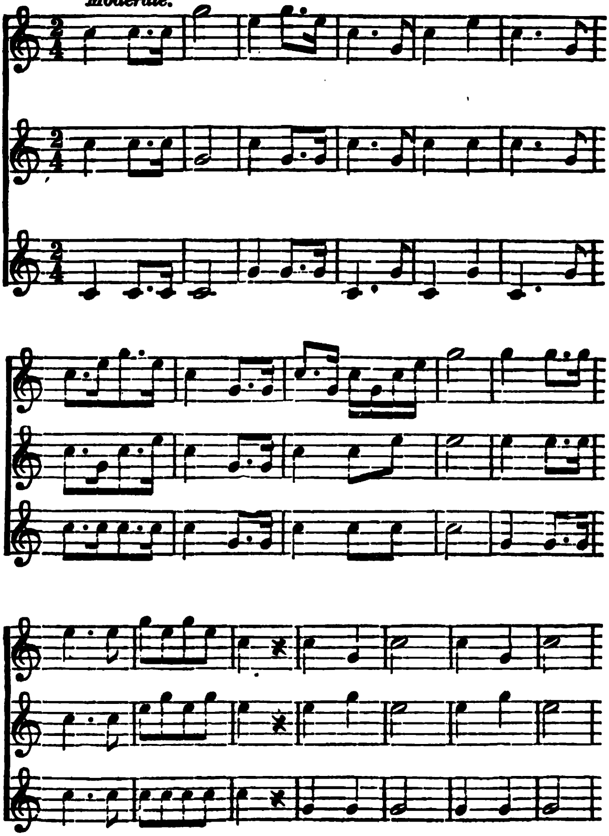


15. REVEILLE.

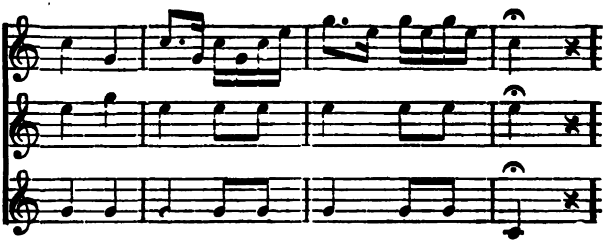


16. RETREAT.

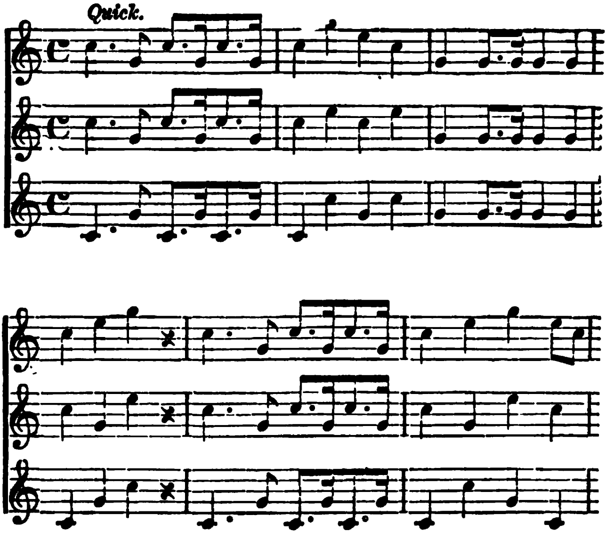
Moderato.



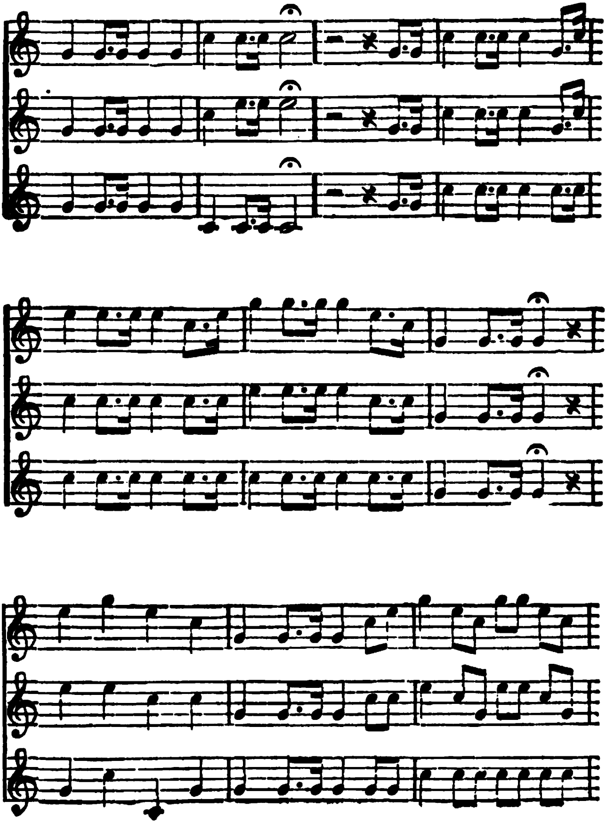
RETREAT—*Concluded.*



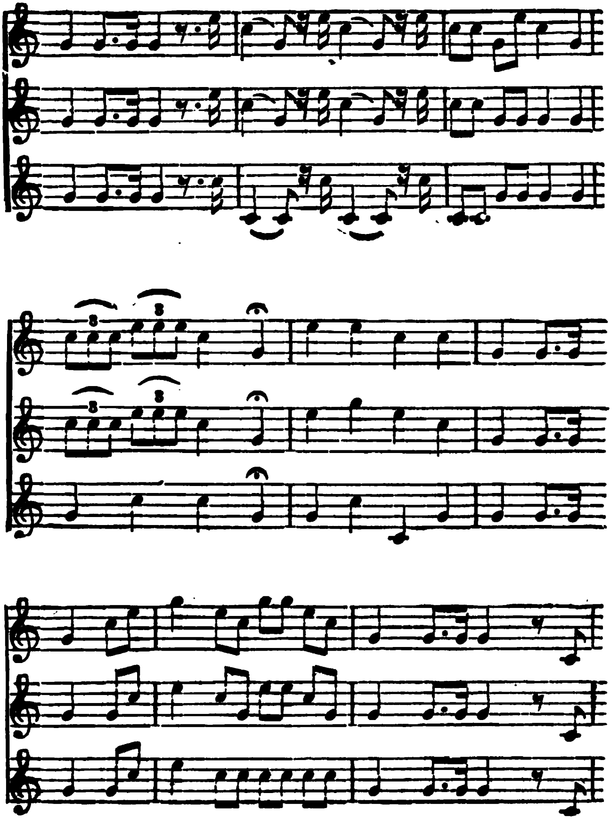
17. TATTOO.



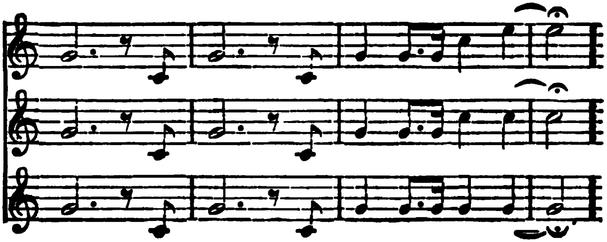
TATTOO—*Continued.*



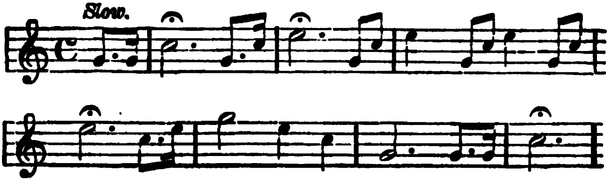
TATTOO—*Continued.*



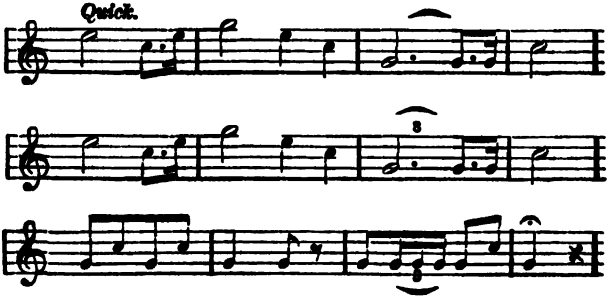
TATTOO—*Concluded.*



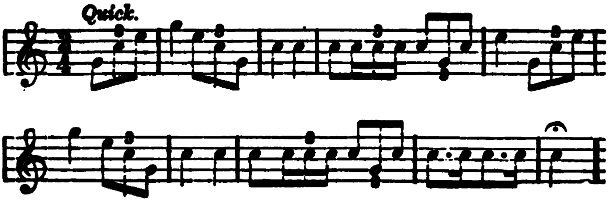
18. TAPS.



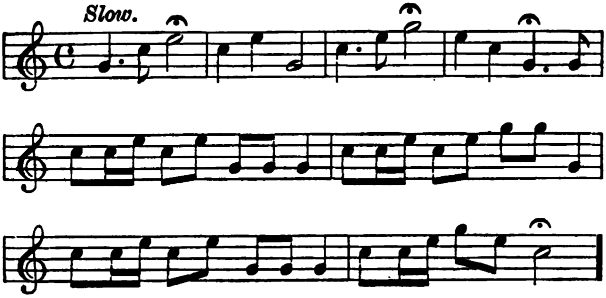
19. MESS.



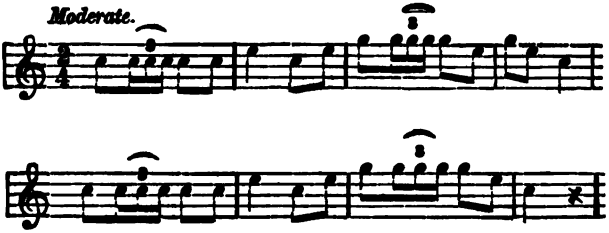
20. SICK.



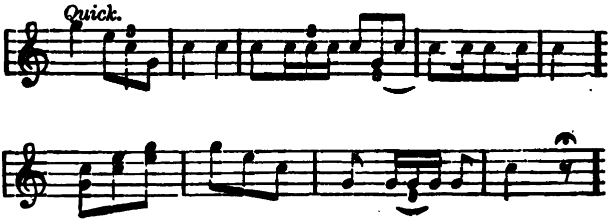
21. CHURCH CALL.



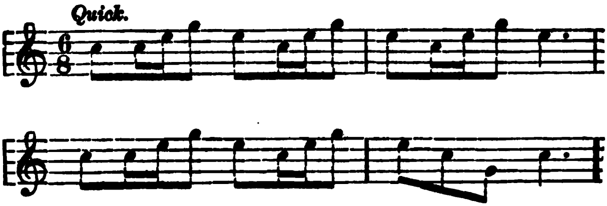
22. RECALL.



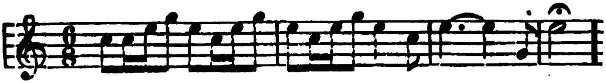
23. ISSUE.



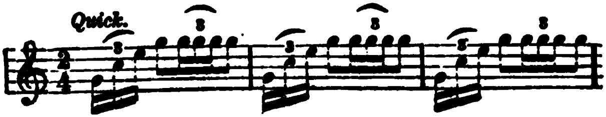
24. OFFICERS' CALL.



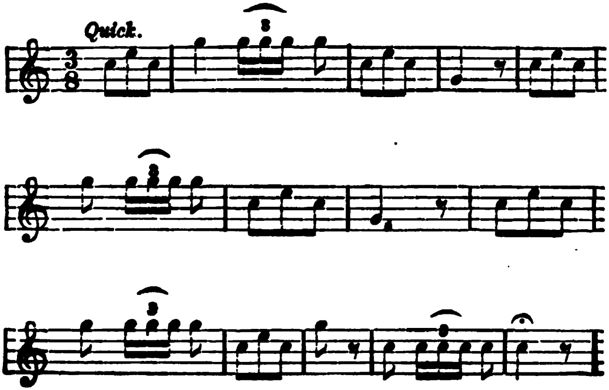
25. CAPTAINS' CALL.



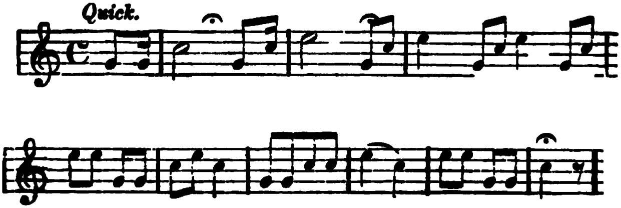
26. FIRST SERGEANTS' CALL.



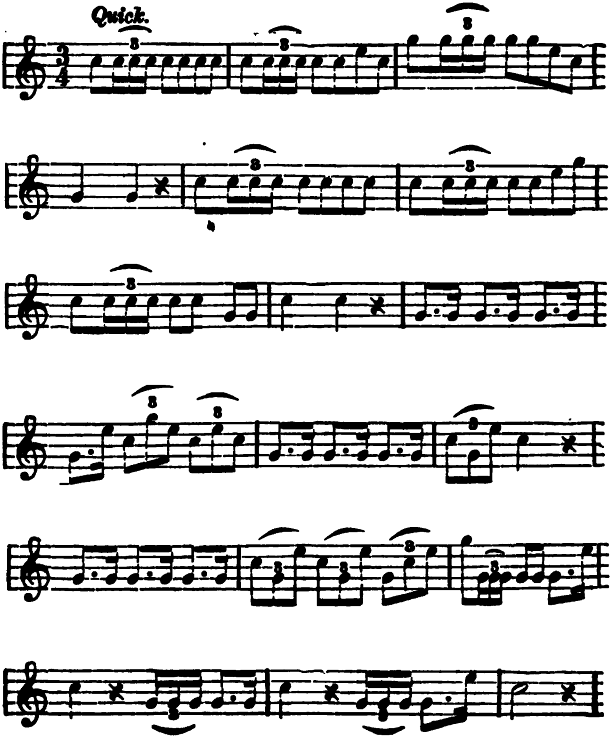
27. FATIGUE.



28. SCHOOL.

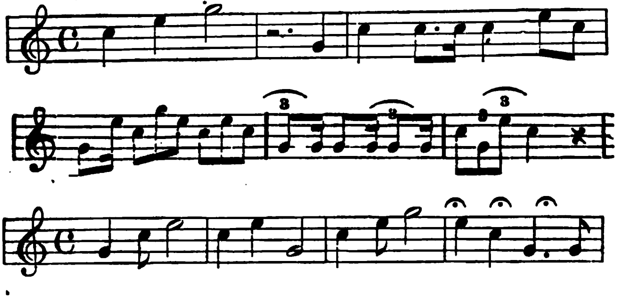


29. THE GENERAL.



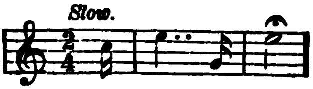
30. CALL TO QUARTERS.

Slow.

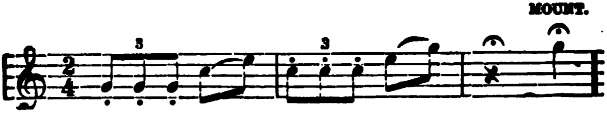


DRILL SIGNALS.

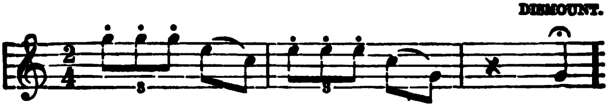
31. Attention.



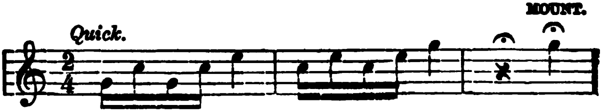
32. Drivers Prepare to Mount.



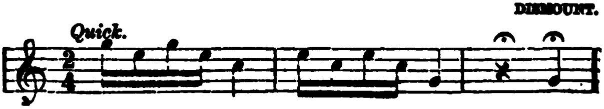
33. Drivers Prepare to Dismount.



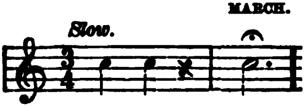
34. Cannoneers Prepare to Mount.



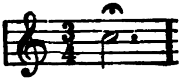
35. Cannoneers Prepare to Dismount.



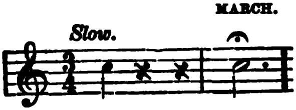
36. FORWARD.



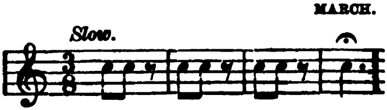
37. HALT.



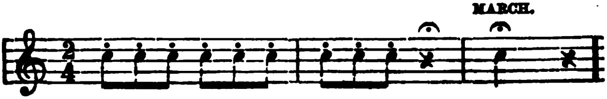
38. WALK.



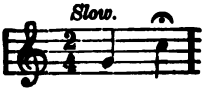
39. TROT.



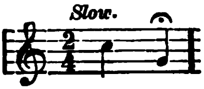
40. GALLOP.



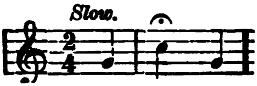
41. GUIDE RIGHT.



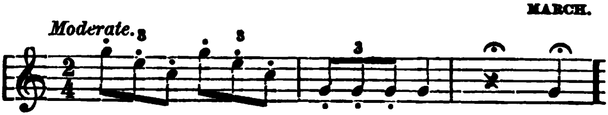
42. GUIDE LEFT.



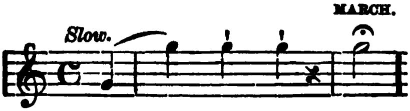
43. GUIDE CENTER.



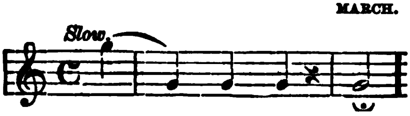
44. COUNTERMARCH.



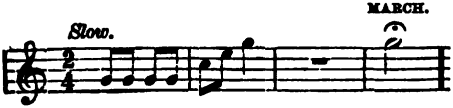
45. RIGHT ABOUT.



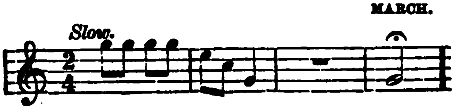
46. LEFT ABOUT.



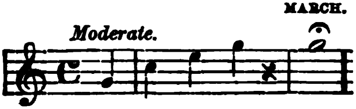
47. COLUMN RIGHT.



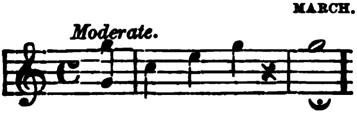
48. COLUMN LEFT.



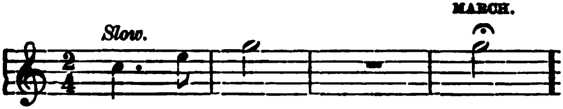
49. BY THE RIGHT FLANK.



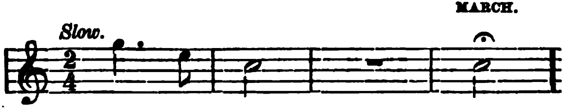
50. BY THE LEFT FLANK.



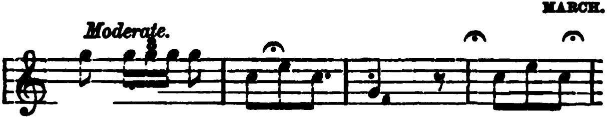
51. RIGHT OBLIQUE.



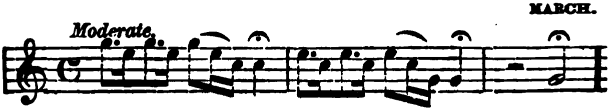
52. LEFT OBLIQUE.



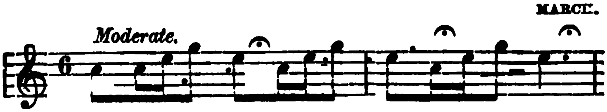
53. RIGHT FRONT INTO LINE.



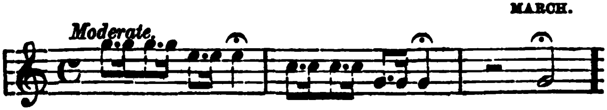
54. LEFT FRONT INTO LINE.



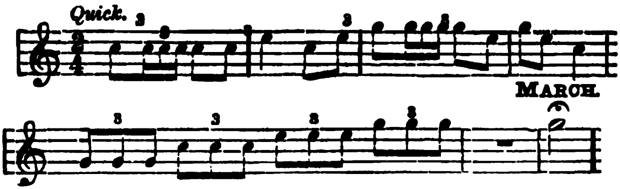
55. ON RIGHT INTO LINE.



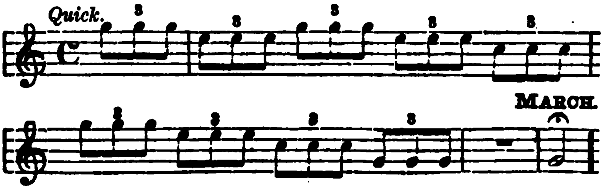
56. ON LEFT INTO LINE.



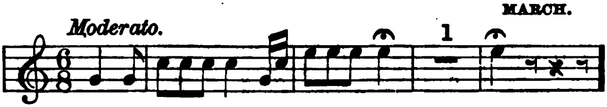
57. BATTERY RIGHT WHEEL.



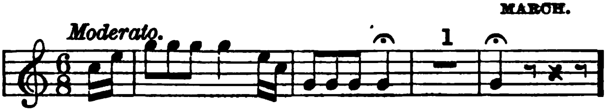
58. BATTERY LEFT WHEEL.



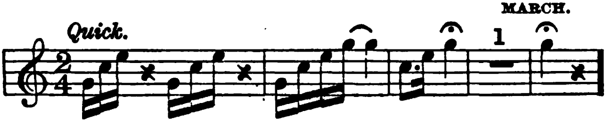
59. PIECES FRONT.



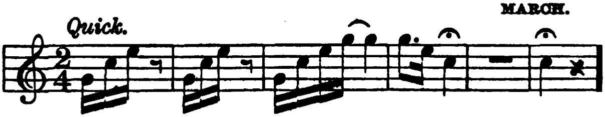
60. CAISSONS FRONT.



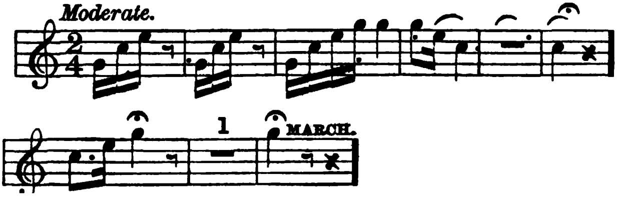
61. DOUBLE SECTION, RIGHT OBLIQUE.



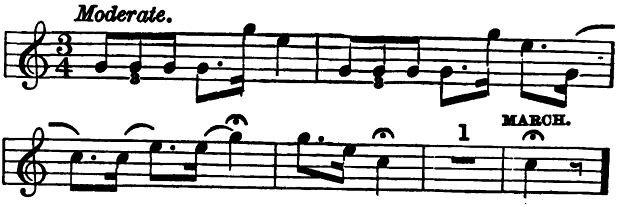
62. DOUBLE SECTION, LEFT OBLIQUE.



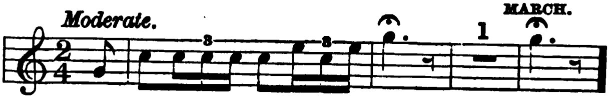
63. FLANK COLUMN, RIGHT OBLIQUE.



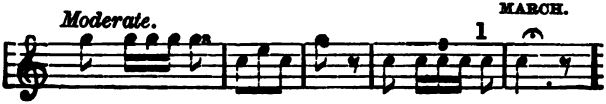
64. FLANK COLUMN, LEFT OBLIQUE.



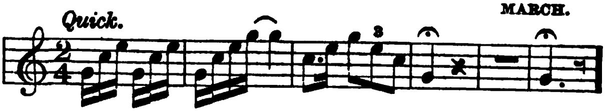
65. RIGHT BY SECTIONS.



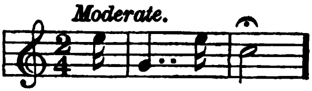
66. LEFT BY SECTIONS.



67. FORM DOUBLE SECTION LINE.



68. ROUTE ORDER.



MISCELLANEOUS BUGLE CALLS.

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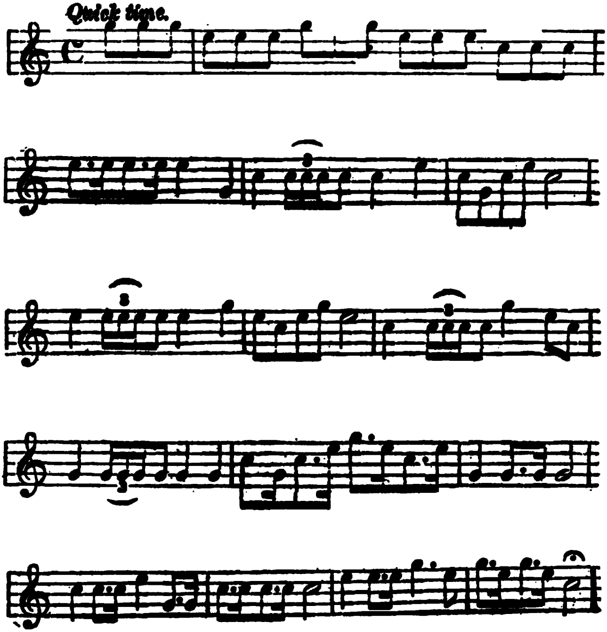
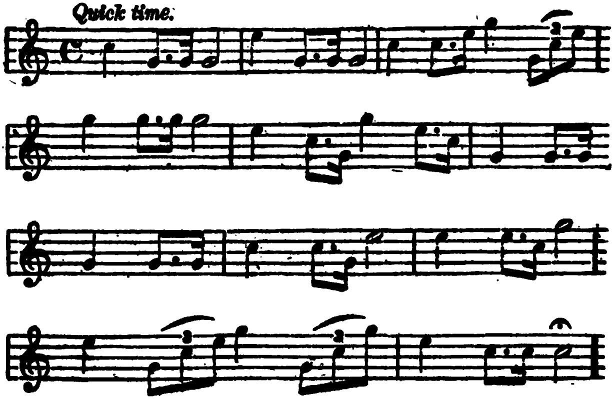
69. PRESIDENT'S MARCH.



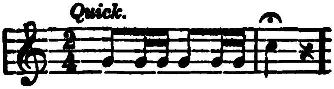
70. GENERAL'S MARCH.

Quick time.

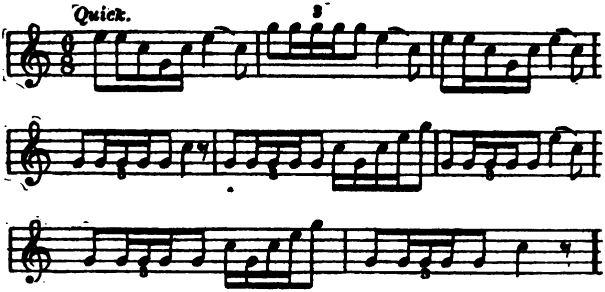


71. FLOURISHES FOR REVIEW.

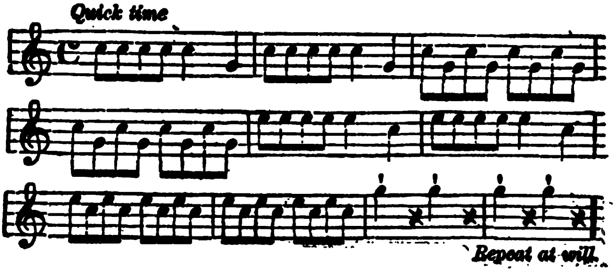
Quick.



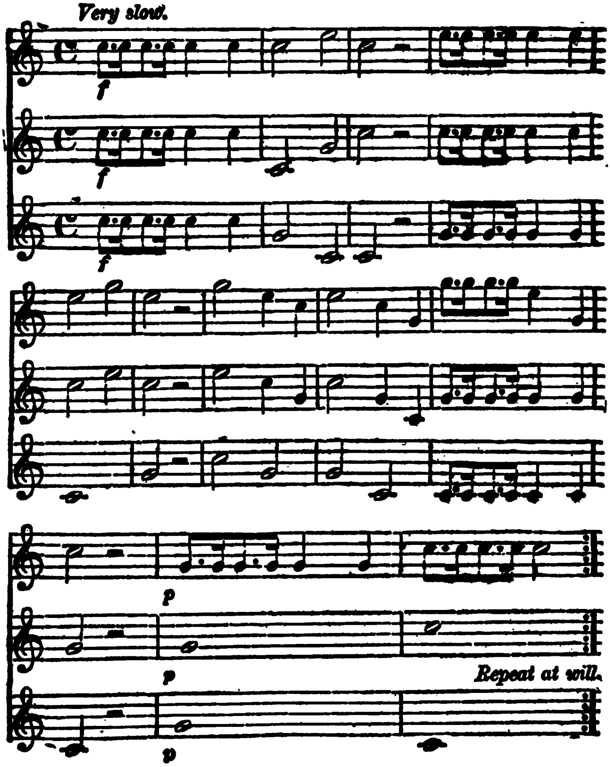
72. SOUND OFF.



73. ROGUE'S MARCH.

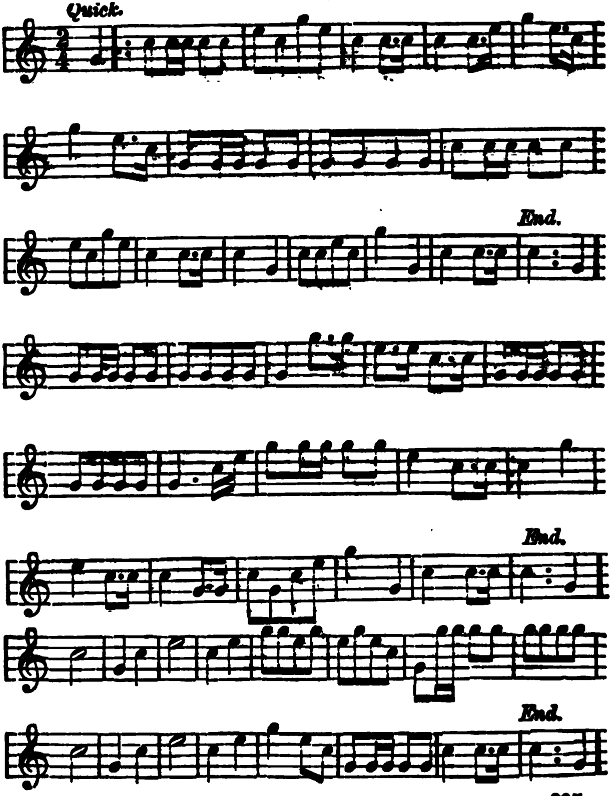


74. FUNERAL MARCH.

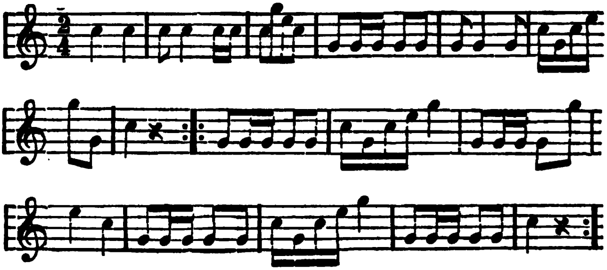


QUICKSTEPS.

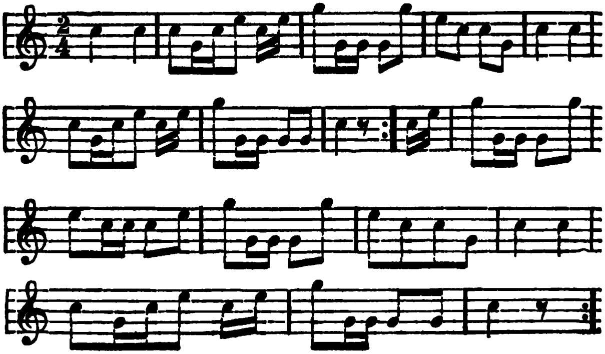
75. QUICKSTEP No. 1.



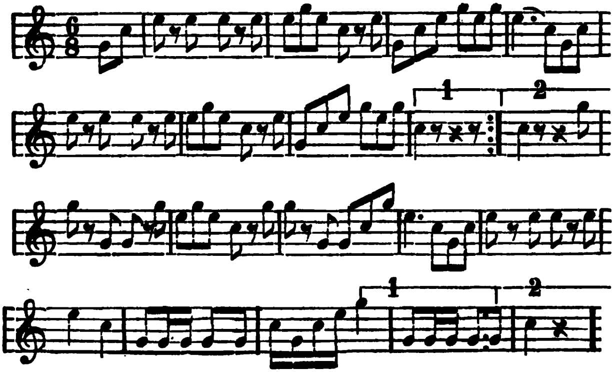
76. QUICKSTEP No. 2.



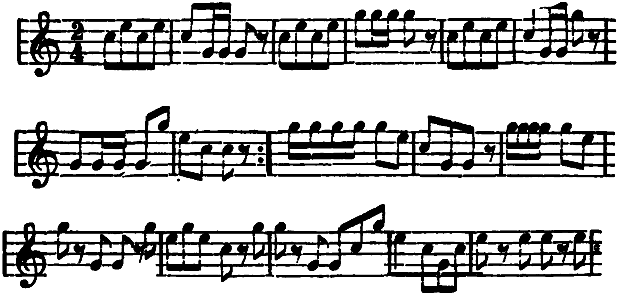
77. QUICKSTEP No. 3.



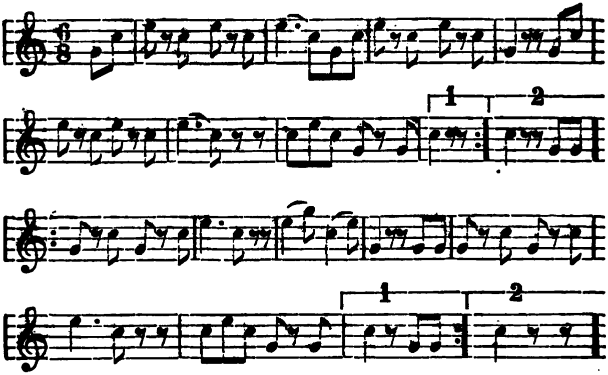
78. QUICKSTEP No. 4.



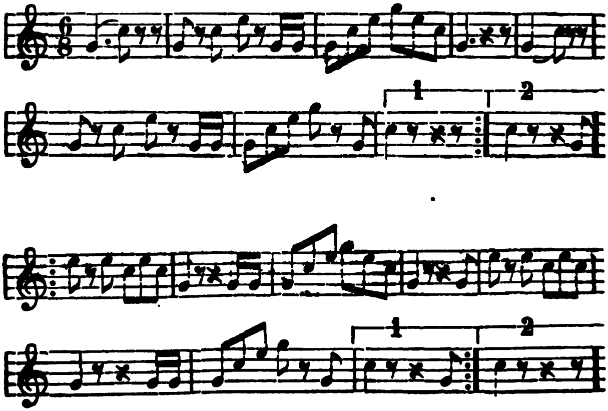
79. QUICKSTEP No. 5.



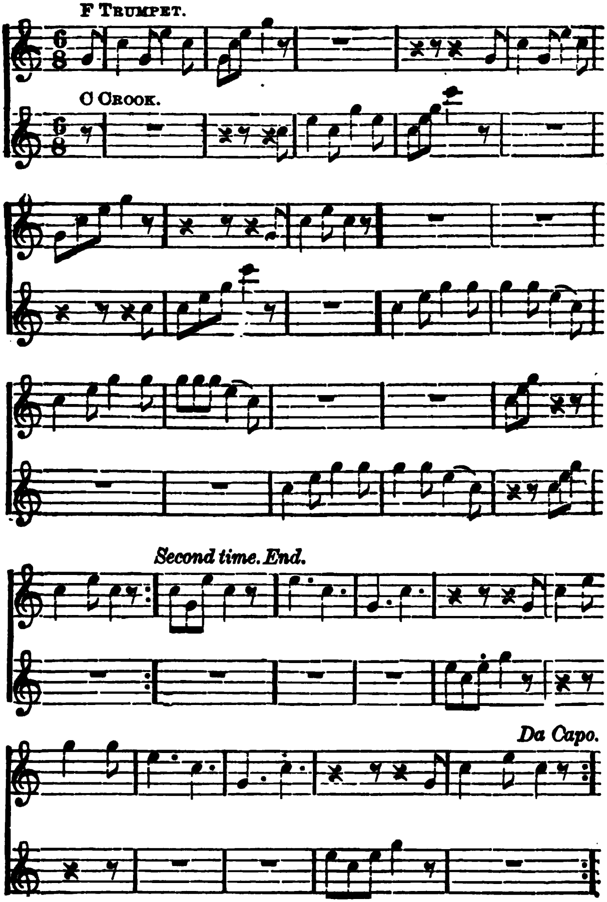
80. QUICKSTEP No. 6.



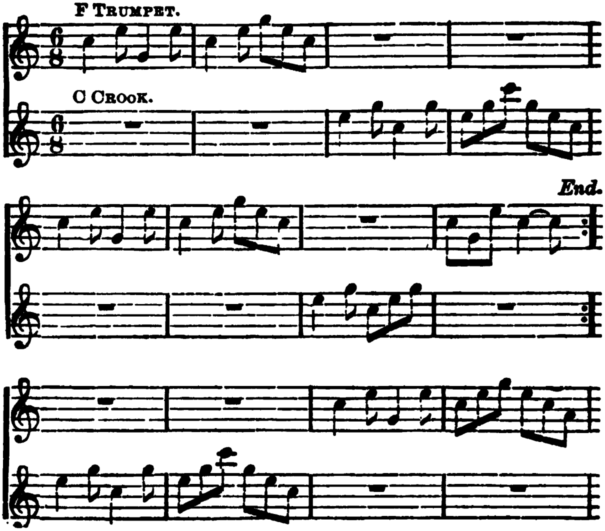
81. QUICKSTEP No. 7.



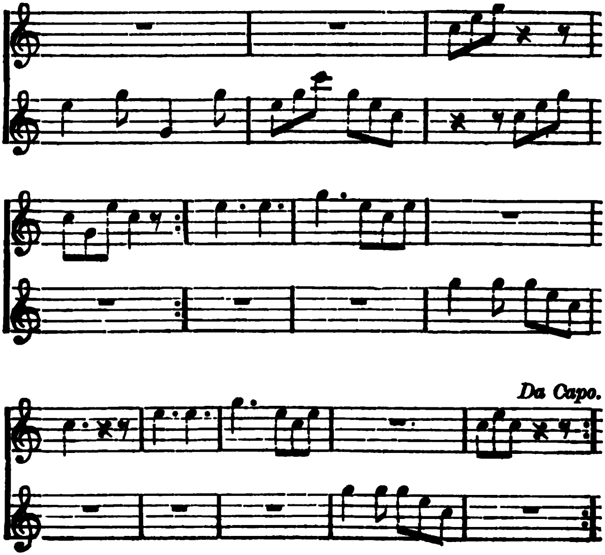
82. QUICKSTEP No. 8.



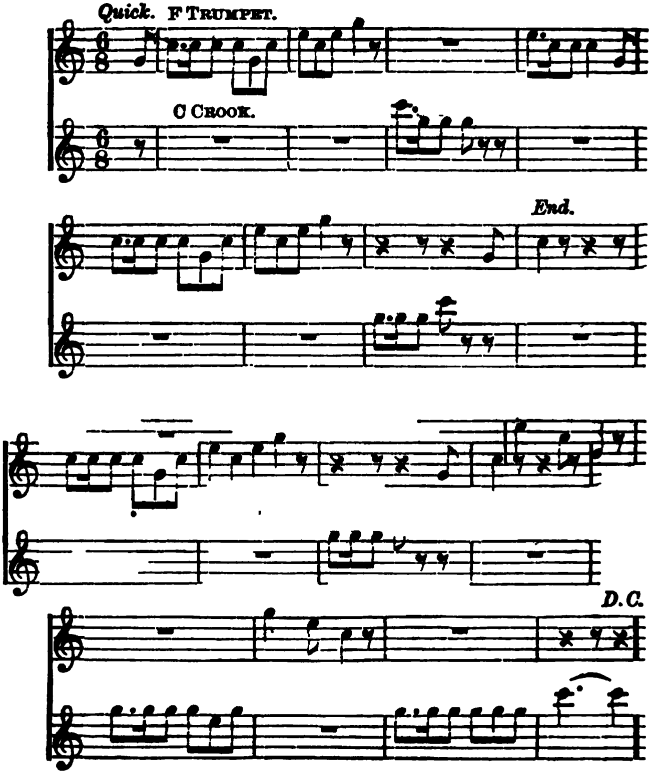
83. QUICKSTEP No. 9.



QUICKSTEP NO. 9—*Concluded.*



84. QUICKSTEP No. 10.



APPENDIX

ORGANIZATION TABLES

UNIV. OF MICHIGAN,
APR 26 1912

APPENDIX 1.—*Light artillery organization—War strength.*

Store wagons	....	....	....	....	....	...	....	....	....	1	..	1	...	3	3	..	..	6	6
Battery wagons	....	....	....	....	....	...	....	....	....	1	..	1	...	3	3	..	..	6	6
4-horse—																			
Reel carts	....	....	....	....	....	...	....	....	....	...	..	....	1	....	1	1	..	2	3
Field wagons	....	....	....	....	....	...	....	....	....	...	4	4	1	12	13	1	1	26	28
Total carriages	....	2	2	2	2	2	2	2	2	2	4	22	2	66	68	2	1	136	139
Animals:																			
Horses—																			
Draft	....	12	12	12	12	12	12	12	12	[3] 16	..	112	4	336	340	4	..	680	684
Saddle	4	4	2	3	2	8	4	4	3	9	2	45	20	135	155	34	34	310	378
Mules	....	....	....	....	....	...	....	....	....	...	16	16	4	48	52	[4] 8	4	104	116
Total animals	4	16	14	15	14	20	16	16	15	25	18	173	28	519	547	46	38	1,094	1,178
Harness:																			
Ordnance Department—																			
Sets wheel	....	2	2	2	2	2	2	2	2	3	..	19	1	57	58	1	..	116	117
Sets lead	....	4	4	4	4	4	4	4	4	5	..	37	1	111	112	1	..	224	225
Quartermaster's Department—																			
Single sets wheel	....	....	....	....	....	...	....	....	....	...	8	8	2	24	26	2	2	52	56
Single sets lead	....	....	....	....	....	...	....	....	....	...	8	8	2	24	26	2	2	52	56
Total harness	....	6	6	6	6	6	6	6	6	8	16	72	6	216	222	6	4	444	454
Ammunition:																			
Carried per section	....	146	146	146	146	176	212	212	212	36	..	1,432	....	4,296	4,296	..	..	8,592	8,592
Carried per gun	....	36.5	36.5	36.5	36.5	44	53	53	53	9	..	358	....	358	358	..	..	358	358

[1] Corporal as acting chief of section.

[2] Guidon.

[3] Includes 1 pair lead and 1 pair wheel horses (spare).

[4] Includes 4 mules, extra team.

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APPENDIX 5.—*Organization of ammunition battery and battalion for supply of 3-inch gun or 3.8-inch howitzer or 4.7-inch howitzer ammunition (6-horse teams).*

	Battery.															Battalion.		
		First half battery.						Second half battery.										
		1st platoon.		2d platoon.		3d platoon.		4th platoon.		5th platoon.		6th platoon.						
Mules	...	...	...	...	...	...	...	...	...	...	...	...	...	16	16	4	48	52
Total animals	6	16	13	14	13	14	13	16	13	14	13	20	13	42	220	20	660	680
Harness:																		
Ordnance department—																		
Sets wheel	...	2	2	2	2	2	2	2	2	2	2	3	2	3	28	...	84	84
Sets lead	...	4	4	4	4	4	4	4	4	4	4	6	4	6	56	...	168	168
Quartermaster department—																		
Single sets wheel	...	...	...	...	...	...	...	...	...	...	...	...	...	8	8	2	24	26
Single sets lead	...	...	...	...	...	...	...	...	...	...	...	...	...	8	8	2	24	26
Ammunition:																		
Carried per ammunition section.	60 for 4.7-inch howitzer; 212 for 3-inch gun; 96 for 3.8-inch howitzer.															212 for 3-inch gun. 96 for 3.8-inch howitzer.		
Carried per gun	90 for 4.7-inch howitzer; 106 for 3-inch gun; 144 for 3.8-inch howitzer.															106 for 3-inch gun. 144 for 3.8-inch howitzer.		

[1] Reconnaissance officer and agent.
[2] 2 3-inch guns; 1 3.8-inch howitzer.
[3] 36 3-inch caissons; 36 3.8-inch caissons.
[4] Includes 1 spare team.

APPENDIX 6.—*Organization of ammunition battery and battalion for supply of 3-inch gun and 4.7-inch howitzer ammunition (8-horse teams).*

	Battery.															Battalion.		
		First half battery.						Second half battery.										
Horses—																		
Draft	....	12	12	12	12	12	12	16	16	16	16	22	16	[2] 18	192	....	584	584
Saddle	6	4	1	2	1	2	1	4	1	2	1	2	1	8	36	16	108	124
Mules	....	....	....	....	....	....	....	....	....	....	....	....	....	16	16	4	52	56
Total animals	6	16	13	14	13	14	13	20	17	18	17	24	17	42	244	20	744	764
Harness:																		
Ordnance Department—																		
Sets wheel	....	2	2	2	2	2	2	2	2	2	2	3	2	3	28	....	81	81
Sets lead	....	4	4	4	4	4	4	6	6	6	6	8	6	6	68	....	201	201
Quartermaster's Department—																		
Single sets wheel	....	....	....	....	....	....	....	....	....	....	....	....	....	8	8	2	26	28
Single sets lead	....	....	....	....	....	....	....	....	....	....	....	....	....	8	8	2	26	28
Ammunition:																		
Carried per ammunition section.	212 for 3-inch gun; 60 for 4.7-inch howitzer															212 for 3-inch gun; 60 for 4.7-inch howitzer.		
Carried per gun	106 for 3-inch gun; 90 for 4.7-inch howitzer															106 for 3-inch gun; 60 for 4.7-inch howitzer.		

[1] Reconnaissance officer and agent.

[2] Includes 1 spare team.

Appendix 7.—*Organization of ammunition battery and battalion for supply of 4.7-inch gun, 4.7-inch howitzer, or 6-inch howitzer ammunition (8-horse teams).*

	Battery.															Battalion.		
		First half battery.						Second half battery.										
		1st platoon.		2d platoon.		3d platoon.		4th platoon.		5th platoon.		6th platoon.						
Total carriages	....	2	2	2	2	2	2	2	2	2	2	3	2	7	32	1	95	96
Animals:																		
Horses—																		
Draft	....	16	16	16	16	16	16	16	16	16	16	24	16	[2] 24	224	....	616	616
Saddle	6	4	1	2	1	2	1	4	1	2	1	2	1	8	36	16	108	124
Mules	....	....	....	....	....	....	....	....	....	....	....	....	....	20	20	4	56	60
Total animals	6	20	17	18	17	18	17	20	17	18	17	26	17	52	280	20	780	800
Harness:																		
Ordnance Department—																		
Sets wheel	....	2	2	2	2	2	2	2	2	2	2	3	2	3	28	....	84	84
Sets lead	....	6	6	6	6	6	6	6	6	6	6	9	6	9	84	....	224	224
Quartermaster's Department—																		
Single sets wheel	....	....	....	....	....	....	....	....	....	....	....	....	....	10	10	2	28	30
Single sets lead	....	....	....	....	....	....	....	....	....	....	....	....	....	10	10	2	28	30
Ammunition:																		
Carried per ammunition section	112 for 4.7-inch gun; 60 for 4.7-inch howitzer; 56 for 6-inch howitzer.																	
Carried per gun	168 for 4.7-inch gun; 90 for 4.7-inch howitzer; 84 for 6-inch howitzer.																	

[1] Reconnaissance officer and agent.

[2] Includes 1 spare team.